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ANNUAL
MEDICAL AND HEALTH
REPORT

FOR THE YEAR

1930.

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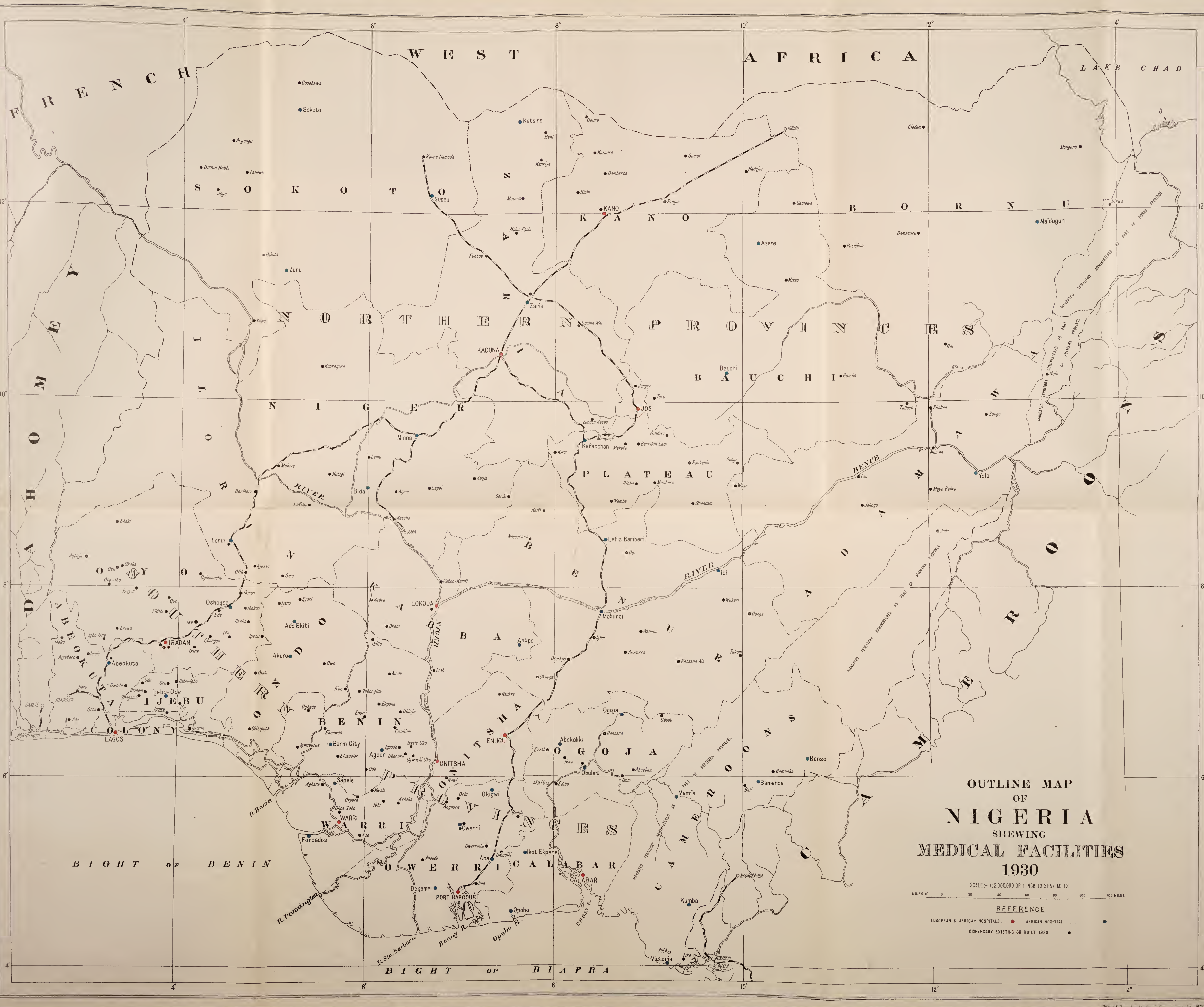

OUTLINE MAP OF NIGERIA SHEWING MEDICAL FACILITIES 1930

SCALE:- 1:2,000,000 OR 1 INCH TO 31·57 MILES

Drawn & Reproduced by Nigeria Surveys, Lagos June. 1931

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Annual Medical and Sanitary Report on Nigeria for the Year ending 31st December, 1930.

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I.—ADMINISTRATION.

A.—ESTABLISHMENT.

(*a*) EUROPEAN STAFF.

MEDICAL.

Director of the Medical and Sanitary Service.
Deputy Director of Medical Service.
2 Assistant Directors of Medical and Health Service.
4 Assistant Directors of Medical Service.
5 Specialist Medical Officers (four appointed).
11 Senior Medical Officers.
1 Alienist Medical Officer.
1 Research Medical Officer.
1 Superintendent of the Dispensers' Training School.
96 Medical Officers (five vacancies).
4 Lady Medical Officers.
2 Government Dentists.
2 Pharmacists.

CLERICAL.

1 Assistant Accountant.
1 Office Assistant.
4 Chief Dispenser Storekeepers.

NURSING.

2 Matrons.
9 Senior Nursing Sisters.
51 Nursing Sisters.

TSETSE INVESTIGATION (Temporary).

1 Deputy Director.
1 Sleeping Sickness Officer.
1 Entomologist.
1 Immunologist.
1 Biochemist.
1 Technical Assistant.

LABORATORY.

1 Deputy Director of Laboratory Service.
1 Senior Pathologist.
12 Pathologists (eight appointed).
2 Biochemists (one appointed and seconded to Tsetse Investigation).
1 Entomologist (seconded to Tsetse Investigation).
1 Immunologist (seconded to Tsetse Investigation).
7 Technical Assistants (six appointed—one seconded to Tsetse Investigation).

SANITATION.

1 Deputy Director of Health Service.
1 Assistant Director of Health Service.
5 Senior Health Officers.
13 Medical Officers of Health (twelve appointed).
33 Sanitary Inspectors.

(b) African Staff.

Medical.

6 Medical Officers.
2 Junior Medical Officers (Temporary Appointments).
1 Assistant Accountant.
1 Chief Clerk.
4 Assistant Chief Clerks.
13 First Class Clerks.
35 Second Class Clerks and Probationers.
2 Chief Dispensers.
7 Senior Dispensers.
20 First Class Dispensers.
73 Second Class Dispensers.
25 Dispensers-in-Training.
1 Chief Storekeeper.
2 Assistant Chief Storekeepers.
3 First Class Storekeepers.
5 Second Class Storekeepers.
11 Senior Nurses (eight provided).
28 Charge Nurses.
70 First Class Nurses.
195 Second Class Nurses.
145 Nurses-in-Training.
1 Senior Laboratory Attendant (unfilled).
3 First Class Laboratory Attendants.
9 Second Class Laboratory Attendants.
14 Third Class Laboratory Attendants.
1 Charge Attendant, Lunatic Asylum.
25 Attendants, Lunatic Asylum.
3 Senior Wardens.
10 Wardens.
2 Assistant Wardens.
10 Attendants, Leper Asylum.

Sanitation.

2 Chief Sanitary Inspectors (none appointed.)
5 Senior Sanitary Inspectors (none appointed.)
10 First Class Sanitary Inspectors.
46 Second Class Sanitary Inspectors.
33 Third Class Sanitary Inspectors.
18 Sanitary Inspectors-in-Training.
40 Sub-Inspectors of Sanitation.
1 Laboratory Attendant.
64 Vaccinators.
1 Registrar of Vital Statistics.
2 Deputy Registrars of Vital Statistics.
1 Assistant Chief Clerk.
3 First Class Clerks.
15 Second Class Clerks and Probationers.
2 Second Class Dispensers.
1 Charge Nurse.
4 First Class Nurses.
10 Second Class Nurses.
8 Nurses-in-Training.

B.—LIST OF ORDINANCES, REGULATIONS, ETC., AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR.

Serial No.	Date.	Short Title and Application.	
		ORDINANCES.	
8/1930	27.2.1930	An Ordinance to amend the Public Health Ordinance.	
9/1930	27.2.1930	An Ordinance to provide for the change of Official and Departmental Titles appearing in Enactments.	
10/1930	27.2.1930	An Ordinance to amend the Lunacy Ordinance.	
17/1930	18.10.1930	An Ordinance to amend the Poisons and Pharmacy Ordinance, 1927.	
23/1930	18.10.1930	An Ordinance to amend the Lunacy Ordinance.	
24/1930	18.10.1930	An Ordinance to make Provision for the Registration of Midwives and to Regulate the Practice of Registered Midwives.	

Serial No.	Date.	Ordinance made under.	Provision.
		ORDERS-IN-COUNCIL.	
27/1929	23.12.1929	The Dangerous Drugs Ordinance, 1927 (No. 16 of 1927).	Ordering the application of Part III of Dangerous Drugs Ordinance, 1927, to Ester of Morphine and their respective Salts, and to any preparation, admixture and extract containing any of the said Esters. And the application of the Order to British Cameroons, Protectorate and Colony.
34/1930	2.6.1930	The Building Lines Regulation Ordinance (Chap. 108).	Ordering amendment to Order-in-Council No. 27/1928 of 30th August, 1928.
43/1930	9.7.1930	Public Health Ordinance.	Application of Sections 25, 26, 29, 31 of the Public Health Ordinance to the Area Comprised within a circle having a radius of one mile with its Centre at the Imo River Railway Station in Owerri Province.

B.—LIST OF ORDINANCES, REGULATIONS, ETC.—*continued.*

Serial No.	Date.	Ordinance made under.	Provision.
		ORDERS-IN-COUNCIL —*continued.*	
48/1930	2.9.1930	Public Health Ordinance.	Amendment to Order-in-Council made under the Public Health Ordinance and published in the *Gazette* of the 10th June, 1926, by deletion of paragraph (*b*) and by the substitution therefore of the following paragraph (*a*) "All land at Tiko lying within a radius of one and a half miles from the Post Office."
		REGULATIONS.	
2/1930	20.1.1930	The Quarantine Ordinance, 1926, (No. 18 of 1926).	Under Section 4 of the Quarantine Ordinance, 1926, Regulations made by the Governor-in-Council and these regulations may be cited as the Quarantine Regulations, 1930, and shall apply to the British Cameroons as well as to the rest of the Protectorate and the Colony.
5/1930	20.1.1930	The Poisons and Pharmacy Ordinance, 1927, No. 15 of 1927.	Under Section 32 of the Poisons and Pharmacy Ordinance, 1927, the following Regulations have been made by the Governor-in-Council. Regulations 18 and 19 of the Poisons and Pharmacy Regulations, 1927, are hereby amended by deleting the words "the Director of the Medical and Sanitary Service" wherever they occur therein and by substituting therefore the words "An Assistant Director of Medical and Sanitary Service." Regulation 25 amended also by adding after the first paragraph the following:—"Such last mentioned list shall conform with the requirements of the Director of Medical and Sanitary Service who may, subject to notification in the *Gazette*, prescribe such list."
10/1930	28.4.1930	The Hospital Fees Ordinance.	Regulation 17, of the Hospital Fees Regulations, 1925, is hereby amended by deleting the words "All Medical Officers, Sanitary Officers and Medical Officers of Health" and substituting "All Registered Medical Practitioners in the Service of the Government whether in the Medical or Health branch Service."

B.—List of Ordinances, Regulations, etc.—*continued.*

Serial No.	Date.	Ordinance made under.	Provision.
		REGULATIONS—*continued.*	
24/1930	2.9.1930	The Dangerous Drugs Ordinance. 1927 (No. 16 of 1927).	Regulation 2 of the Dangerous Drugs Regulations, 1929, amended by deletion of "Qualified Veterinary Surgeon" and substituting "Qualified Veterinary Surgeon" means any person who is a fellow or member of the Royal College of Veterinary Surgeons, or who possesses a veterinary qualification recognised by the Governor-in-Council.
		RULES.	
2/1930	13.8.1930	The Townships Ordinance.	Ordering that no person shall hawk goods, set up stall or stable near any street without written permit from the Local Authority in the Township of Jos.

C.—Financial.

Revenue	£10,799 12s. 0d.
Expenditure	£460,656 0s. 0d.

The total Medical and Sanitary Expenditure for the year 1930 of £460,656, is about a fourteenth of the estimated General Expenditure for 1930–31.

II.—PUBLIC HEALTH.

A.—GENERAL REMARKS.

Once more the numbers of African in-patients and out-patients show an increase upon previous years. A comparison of work accomplished during the past ten years shows that the number of African in-patients has increased by fifty-six *per cent.* in this period, and those of out-patients by 188 *per cent.*

	1928.	1929.	1930.
(*a*) *Total Hospital treatment.*			
European In-patients	1,553	1,470	1,412
Non-European In-patients	29,173	32,068	37,517
European Out-patients	8,629	8,181	7,917
Non-European Out-patients	354,191	391,008	399,260
Major Operations	5,441	4,311	7,863
Minor Operations	4,186	8,113	8,335
PROVINCIAL DISTRIBUTION.			
(*b*) *Northern Provinces.*			
In-patients, Non-European	10,904	12,907	15,378
Out-patients, Non-European	87,476	119,624	111,806
			27184
(*c*) *Colony, Southern Provinces and Cameroons.*			309593
			[illegible]
Out-patients, Non-European	266,615	271,384	287,451
In-patients, Non-European	18,269	19,161	22,139
			[illegible]

It was hoped that in 1930 the staff of the Medical Service would be brought up to authorised strength but owing to financial stringency six vacancies in the medical branch could not be filled, and the vacancy caused by the invaliding of one Medical Officer of Health could not be filled. This is unfortunate at a time when extension of Medical Service to the African population, largely through the Native Administrations, is occurring. It was, however, found possible to open new Medical stations at Bida, Buea, Owerri and Umudiki.

Progress has been made with the training of African staff which is so essential for the formation of a health service to reach the bulk of the population.

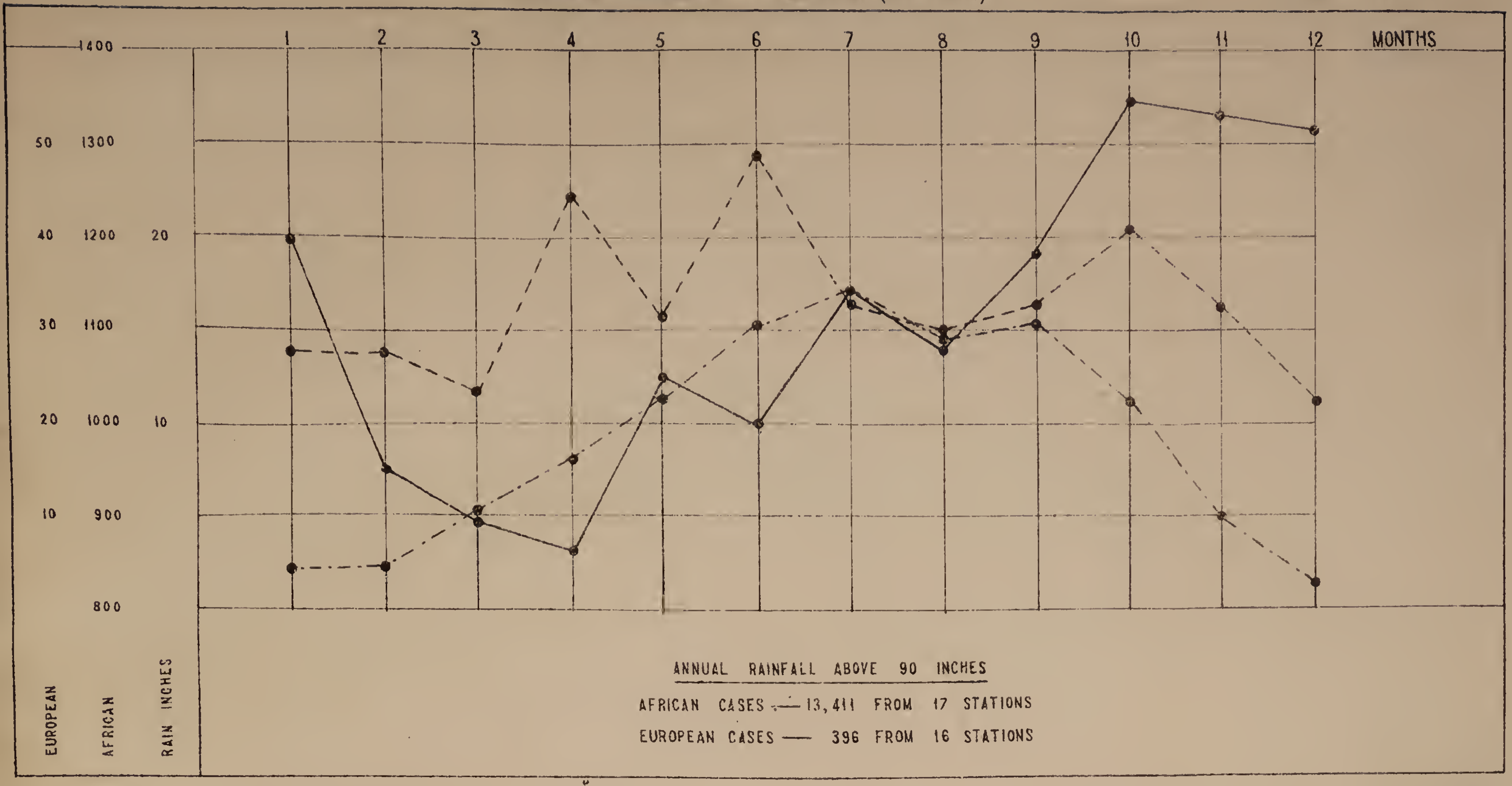
As foreshadowed in the Report for 1929 the first class of African Medical Assistants commenced instructions at Lagos in 1930 and thirteen students are now engaged upon the first science year. In the Northern Provinces the School of Pharmacy at Zaria was opened and the first year's students from the Katsina Training College are now under instruction at that school. The buildings are satisfactory and the students live in a hostel which consists of separate compounds grouped under one roof. Excellent progress was made during the year. A report upon the Medical and Pharmacy Schools at Lagos and of the Pharmacy School at Zaria will be found in Appendix D.

Work commenced at twenty-six medical stations upon the training of African Attendants for the new dispensaries which are being built and equipped by the Native Administrations. The course of instruction given to these lads was outlined in the Report for 1929. Good progress has been made and the dispensaries will be opened during the course of 1931 when it is hoped that 160 dispensaries will be in use.

A re-organisation of the Research and Pathological Services was made during the year by an amalgamation of the staff of the Medical Research Institute with that of the Clinical Pathologists previously shown under the medical service. The whole pathological service,

SEASONAL INCIDENCE OF MALARIA (SUBTERTIAN)

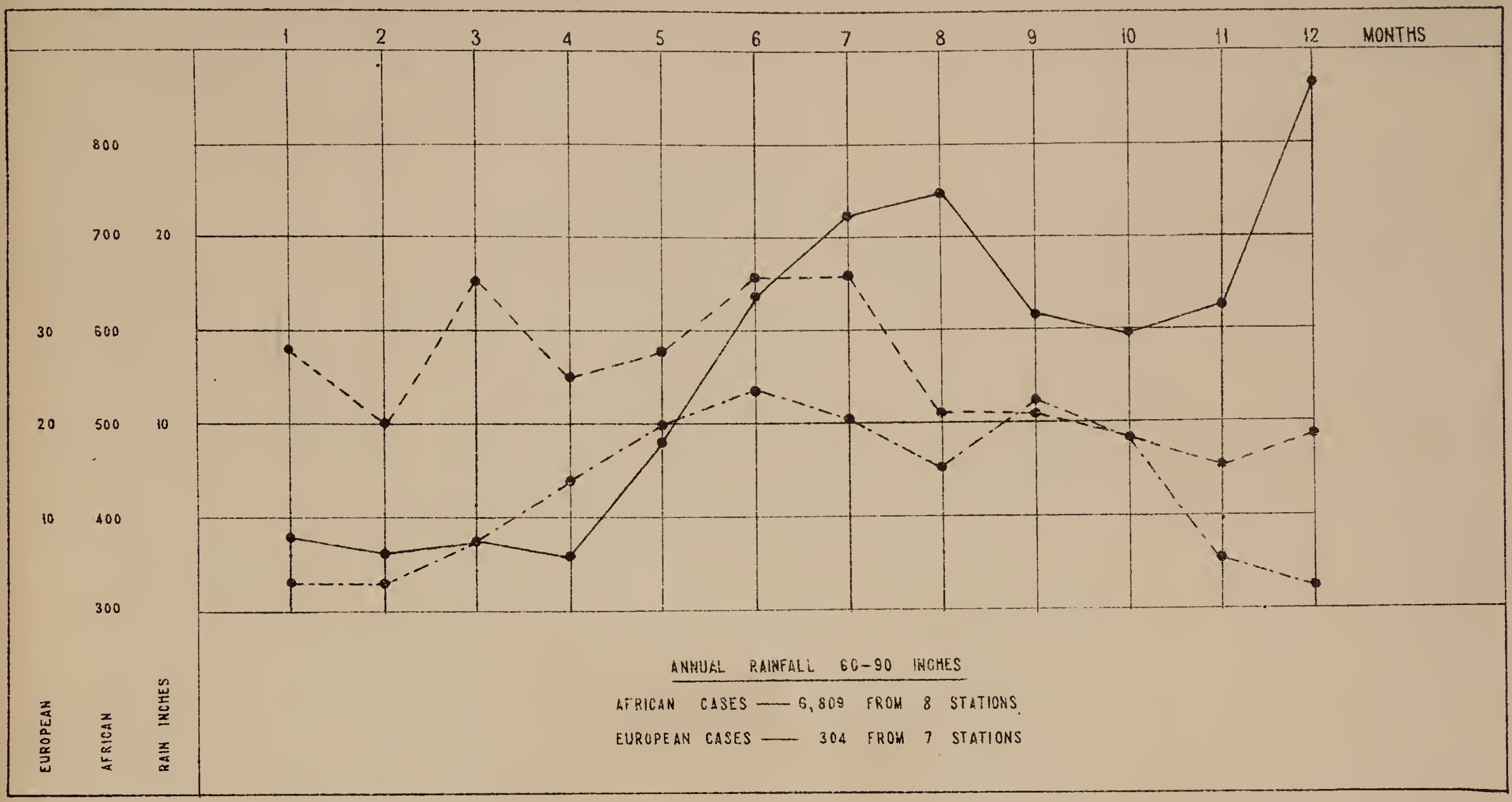
GRAPH Nº 1



ANNUAL RAINFALL ABOVE 90 INCHES

AFRICAN CASES —— 13,411 FROM 17 STATIONS

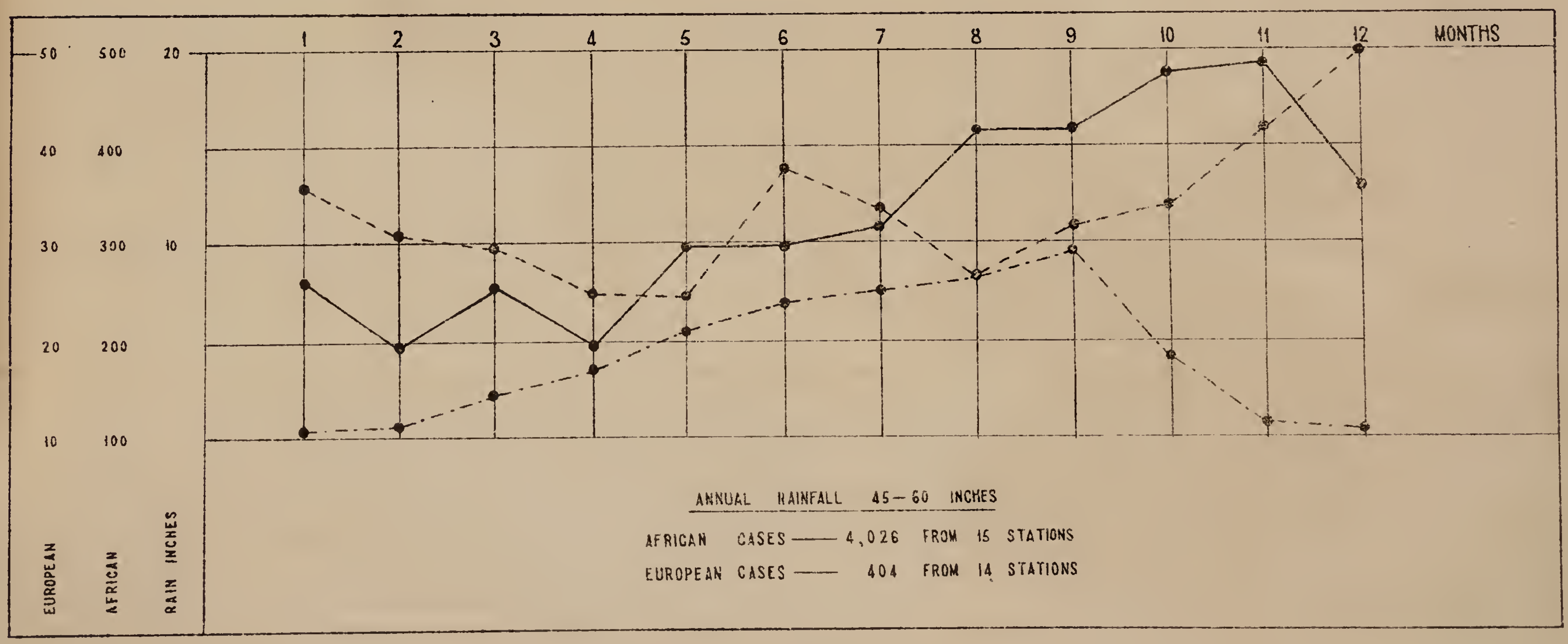
EUROPEAN CASES —— 396 FROM 16 STATIONS



ANNUAL RAINFALL 60–90 INCHES

AFRICAN CASES —— 6,809 FROM 8 STATIONS

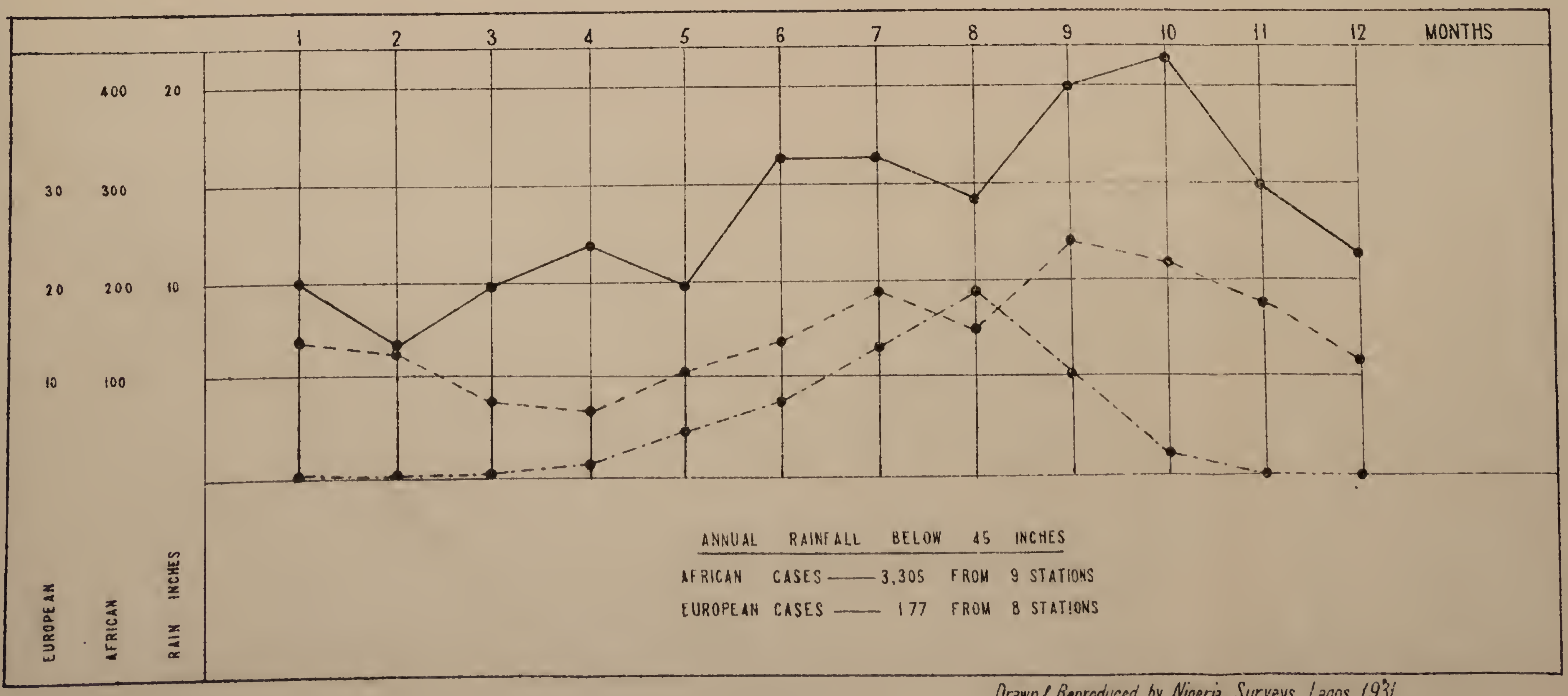
EUROPEAN CASES —— 304 FROM 7 STATIONS



ANNUAL RAINFALL 45–60 INCHES

AFRICAN CASES —— 4,026 FROM 15 STATIONS

EUROPEAN CASES —— 404 FROM 14 STATIONS



ANNUAL RAINFALL BELOW 45 INCHES

AFRICAN CASES —— 3,305 FROM 9 STATIONS

EUROPEAN CASES —— 177 FROM 8 STATIONS

Drawn & Reproduced by Nigeria Surveys, Lagos. 1931

REFERENCE

-·-·-·-·- INDICATES RAINFALL

——— ,, AFRICAN CASES OF MALARIA

- - - - - ,, EUROPEAN ,, ,, ,,

now known as the Laboratory Service, is under the direction of a Deputy Director who was formerly the Director of the Medical Research Institute. The staff of this new department is shown on page 5 and this staff provides for the Medical Research Institute and for Clinical Laboratories at Lagos, Port Harcourt, Calabar, Kaduna and Kano.

At the Medical Research Institute progress has been made with experiments upon the preparation of neuro-vaccine, and it is hoped to prepare vaccine upon a large scale when the new vaccine laboratory has been built in 1931.

I.—GENERAL DISEASES.

A return of diseases and deaths for 1930 is shown in Tables IV and V. The incidence of disease groups is shown in diagramatic form.

Reference has been made in previous reports to the increasing numbers of cases of malignant growths which come under treatment each year. This is again marked, 167 cases of malignant tumours in African patients being seen. Reference to these is made in the report of the Laboratory Service.

Tropical ulcer continues to be a scourge, more particularly in the Northern Provinces; altogether 42,566 cases came under treatment during the year.

Progress has been made upon research into dietetic deficiencies and the value of beniseed as a food was demonstrated by the Dietetics Pathologist. A useful collaboration between departments has been made in the Northern Provinces where a Committee of Animal Husbandry has been formed by representative officers from the Veterinary, Tsetse, Dietetics, Forestry and Geological Survey Departments. A general account of the activity of this Committee is given under the Report of the Tsetse Investigation.

Ten cases of beri-beri with four deaths were reported in African patients during the year. An interesting series of cases of defective vision in school-boys were reported from Okigwi and the Umudiki Training College. These cases completely recovered after a revised dietary scale, drawn up by the Senior Health Officer, had been used and the Principal of the College reports that he has had no further complaints since the new dietary has been in use.

(II) COMMUNICABLE DISEASES.

(a) Mosquito or Insect Borne.

Malaria.—Preventive measures are described under Section III. The incidence of malaria as shown from hospital attendances during the past two years is as follows :—

	1929.		1930.	
	Cases.	Deaths.	Cases.	Deaths.
EUROPEANS.				
Malaria	1,336	5	1,334	1
Blackwater	15	8	17	4
AFRICANS AND OTHER NON-EUROPEANS.				
Malaria	23,001	43	29,430	41
Blackwater	5	1	6	2

The seasonal incidence of clinical signs of malaria, as shown from attendances at hospital, is shown in graph No. 1. This graph has been prepared from figures from a number of medical stations grouped according to annual rainfall into four groups, from the heavy rainfall belt of the coast in the South-east where the rainfall is over ninety inches in the year, to that of the North and North-east where it is under forty-five inches. The figures of incidence for African cases appear to indicate the importance of frequent re-infection, being highest during the period of greatest anopheles breeding at the end of the rainy season and being lowest towards the end of the dry season. Figures for European cases are less striking and regular but here the graph has been made from a comparatively small number of cases.

Cases of blackwater fever are analysed in Appendix A.

Trypanosomiasis.—The work of the Tsetse Investigation is summarised in Appendix B. Sleeping Sickness incidence is given in Section III. and a full description of the work of the Sleeping Sickness Officers appears in Appendix B. The plan of training African Assistants for work in Sleeping Sickness Campaigns, mentioned in the Report for 1929, has proved highly successful, the lads after one year's training being competent to recognise trypanosomes under the microscope, to do gland punctures and to give injections. A report of the work of the Sleeping Sickness Officer in the Tiko area in the southern portion of the Mandated Territory of the Cameroons was forwarded in the report to the League of Nations. One Medical Officer engaged upon Sleeping Sickness work contracted the disease during the year.

Other communicable diseases are dealt with under Section III.

(b) *Infectious Diseases.*

Tetanus.—No European cases occurred. Sixty-three cases with twenty-two deaths were treated in non-Europeans.

Dysentery.—Case incidence during the past three years is shown below.

DYSENTERY CASES, 1928, 1929, 1930.

		EUROPEAN.			AFRICAN.		
		1928.	1929.	1930.	1928.	1929.	1930.
Amoebic ...	Cases ...	125	111	164	2,465	2,826	2,893
	Deaths	—	—	—	76	83	79
Bacillary ...	Cases ...	12	36	32	255	220	285
	Deaths	—	1	—	22	22	29
Undefined ...	Cases ...	21	22	22	962	1,011	1,276
	Deaths	—	—	—	22	53	36
Liver Abscess	Cases ...	10	14	—	65	112	73
	Deaths	—	—	—	4	7	8
Total Cases ...		168	183	218	3,747	4,169	4,527
Total Deaths ...		—	1	—	124	165	152

The seasonal incidence of Amoebic and Bacillary Dysentery, as shown from hospital returns and including European and African cases is shown in Graph No. 2. Stations have been grouped in this graph under four sections according to rainfall. As might be expected Amoebic dysentery incidence shows a peak about May, *i.e.*, in the early rains when water is taken from pools the edges of which have been contaminated in the dry season. In the dry section of the extreme North the incidence is high also during the latter part of the dry season (January-April) and this may be accounted for by dust and flies. The incidence of bacillary dysentery is more irregular, the cases being fewer, and the incidence depending partly upon local epidemic outbreaks in communities such as prisons.

Venereal Diseases and Yaws.—Comparative figures for the past four years of African patients who have come under treatment are as follows :—

	1927.	1928.	1929.	1930.
Yaws	16,952	29,079	42,126	39,943
Syphilis	8,516	12,915	15,828	13,698
Gonorrhoea	7,012	8,927	12,018	12,940

Of the 39,943 cases of yaws, 9,332 cases were treated in the Northern Provinces and 30,611 in the Southern Provinces and Colony, the disease being most prevalent in the eastern portion of the Southern Provinces and in the southern part of the Mandated Territory of the Cameroons. In the Southern Provinces probably as many cases again are treated by Missionaries and private African doctors. The intensive treatment campaign, which has been going on for some years, appears to have had a marked effect in the densely populated province of Owerri which has a population density of from 250-500 per square mile and where the treatment campaign has been most intense. With the assistance of the Colonial Medical Research Council various preparations of Bismuth have been tested in the treatment of yaws. The clinical results have been good, particularly for secondary and tertiary yaws, but owing to the ambulatory nature of much of the treatment serological tests have not been used as control except in a few instances. One Medical Officer, using ' Sobita ' states that his results of treatment of gangosa have been more rapid with this preparation than with N.A.B. One case of yaws occurred in an European Missionary and one doubtful case in an European Sailor.

In contrast with yaws distribution, syphilis is more prevalent in the Northern Provinces, the incidence of cases treated being :—

Colony	235
Southern Provinces	5,438
Northern Provinces	8,025

An interesting situation exists in Bauchi Emirate of Bauchi Province where the Mohammedan Hausa-Fulani town is heavily infected with syphilis whereas the surrounding pagan population suffers greatly from yaws.

Leprosy.—The organisation during 1930 remained the same as in 1929 under the supervision of the Nigerian Secretary of the British Empire Leprosy Relief Association and has now reached the stage when it can be more effectively administered by the local Nigerian Executive Committee of the British Empire Leprosy Relief Association through the provincial committees.

Government granted £4,000 during the year for leprosy relief work in addition to a considerable sum for diets in unorganised centres, various Native Administrations were also generous in their local contributions and the Mission Societies were very helpful.

Government has arranged the distribution of all drugs and equipment required, free to Government institutions and Missionary Societies and on repayment to Native Administrations. Pure hydnocarpus oil is imported in bulk and the esters are now made locally and distributed on request to provincial stores who issue on demand; this is more convenient and expeditious than distribution from Lagos.

All leprosy workers receive regularly the latest literature on the subject and can obtain on request any new drug they require for experimental purposes; at present most of them favour the esters of hydnocarpus.

It was hoped that a large settlement would have been started during the year to serve the provinces of Owerri, Onitsha and Ogoja but there is still a difficulty in obtaining a suitable site; the project is however only in abeyance. Plans are also in preparation for a large settlement in the Benin Province with funds provided by the Colonial Development Fund. Several of the Mission Societies have started treatment centres and cases are treated at practically every Government hospital in Nigeria.

Absolutely accurate figures of lepers under treatment are difficult to obtain but Government Medical Officers had under treatment 4,124 cases during the year to which must be added, although not included in the statistics of this report, 1,326 cases under treatment in the Southern Provinces by Missions and 719 in the Northern Provinces, a total of 6,169 cases treated during the year which shows a great advance on previous years. It must not be concluded from this that leprosy is on the increase; there is no reason whatever to think so, it is only a question of better facilities for treatment.

Other infectious diseases are dealt with under Section III.

(c) *Helminthic Diseases.*

Incidence in school children is mentioned in Section III.

Helminthic infection is almost universal in the African population, ankylostomiasis, usually without marked clinical symptoms, being prevalent throughout the country, taeniasis being more common in the North and ascariasis in the South. The distribution of schistosomiasis is still imperfectly known and is patchy, being generally more common in the North; and guinea worm infection is considerably more common in the Northern Provinces, where 1,761 cases were treated as compared with 791 cases in the Southern Provinces. At hospitals and dispensaries cases came under treatment as follows :—

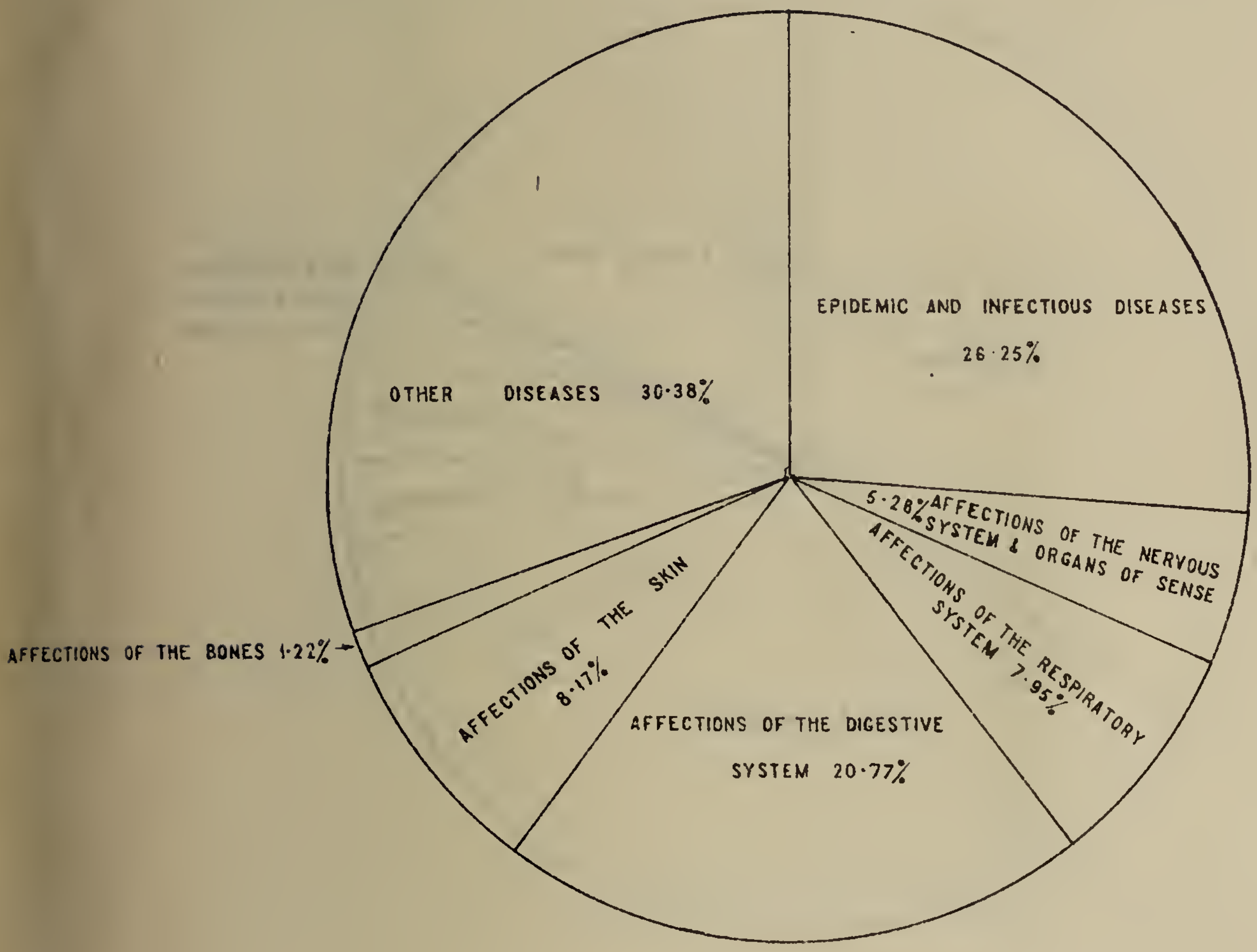
Ankylostomiasis	1,830
Taeniasis	7,546
Ascariasis	20,319
Schistosomiasis	420
Dracunculus	2,552

B.—VITAL STATISTICS.

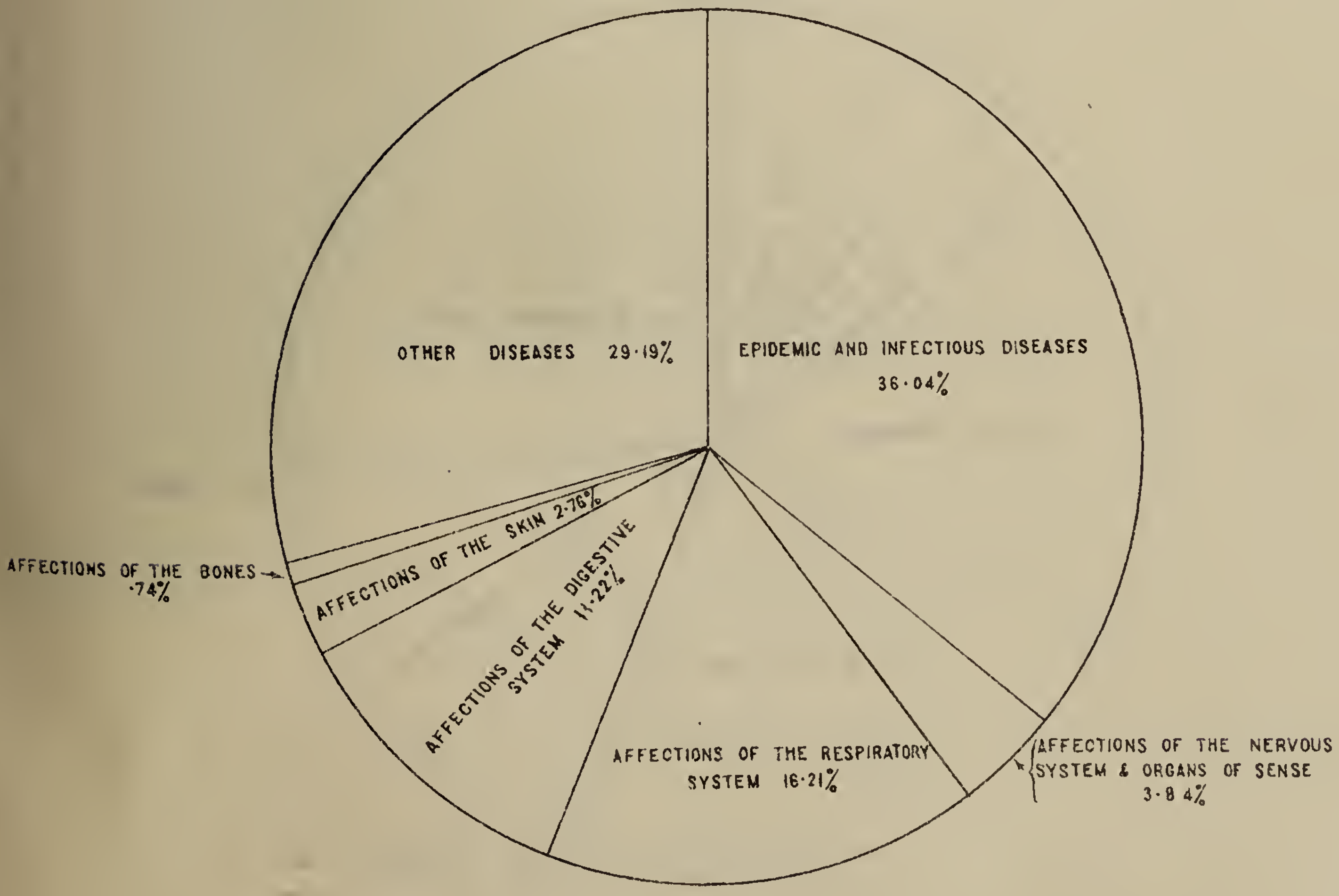
(1) *General African Population.*

The estimated population of Nigeria, including the mandated territory of the Cameroons is 19,308,688.

GENERAL SYSTEMIC AND PREVENTABLE DISEASES
TREATED IN GOVERNMENT INSTITUTIONS
TOTAL CASES 446,106
1930



TOTAL DEATHS 2,425

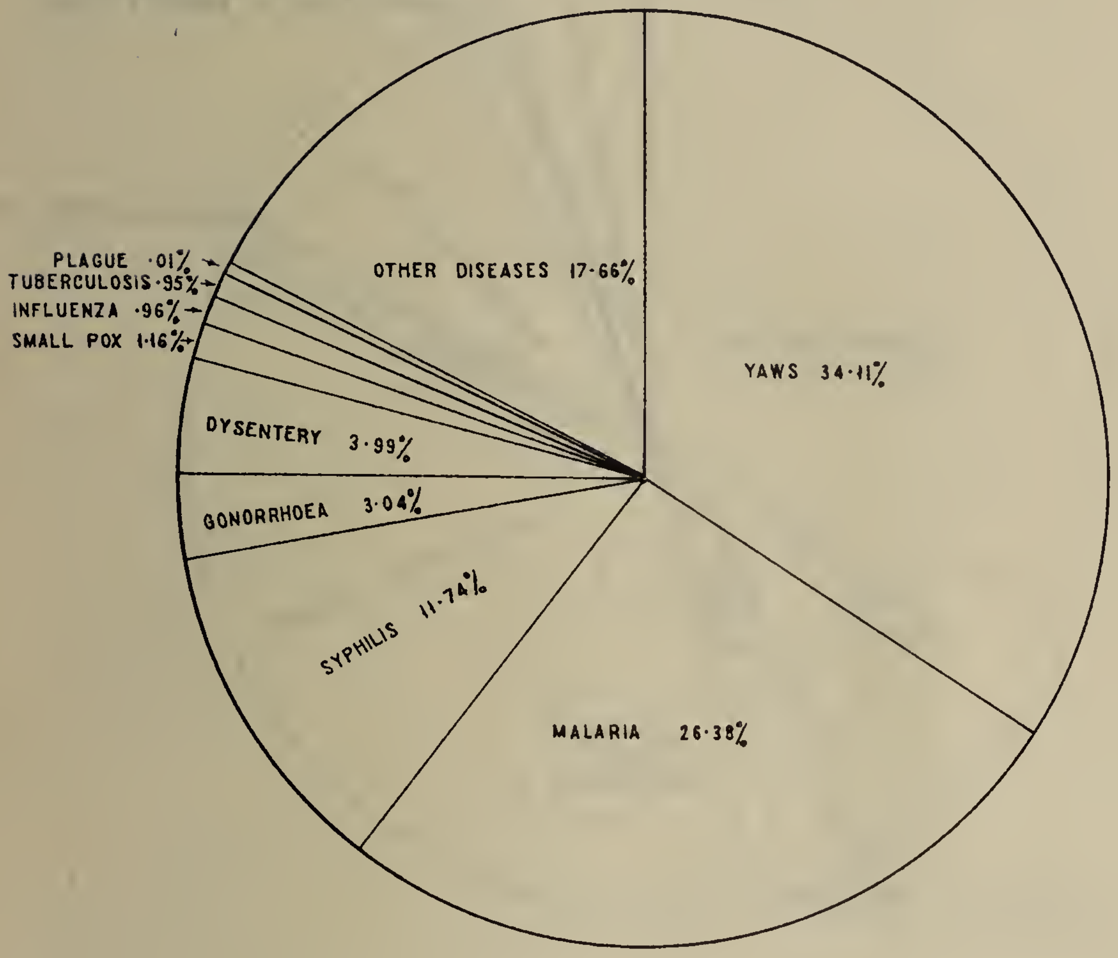


INFECTIVE DISEASES

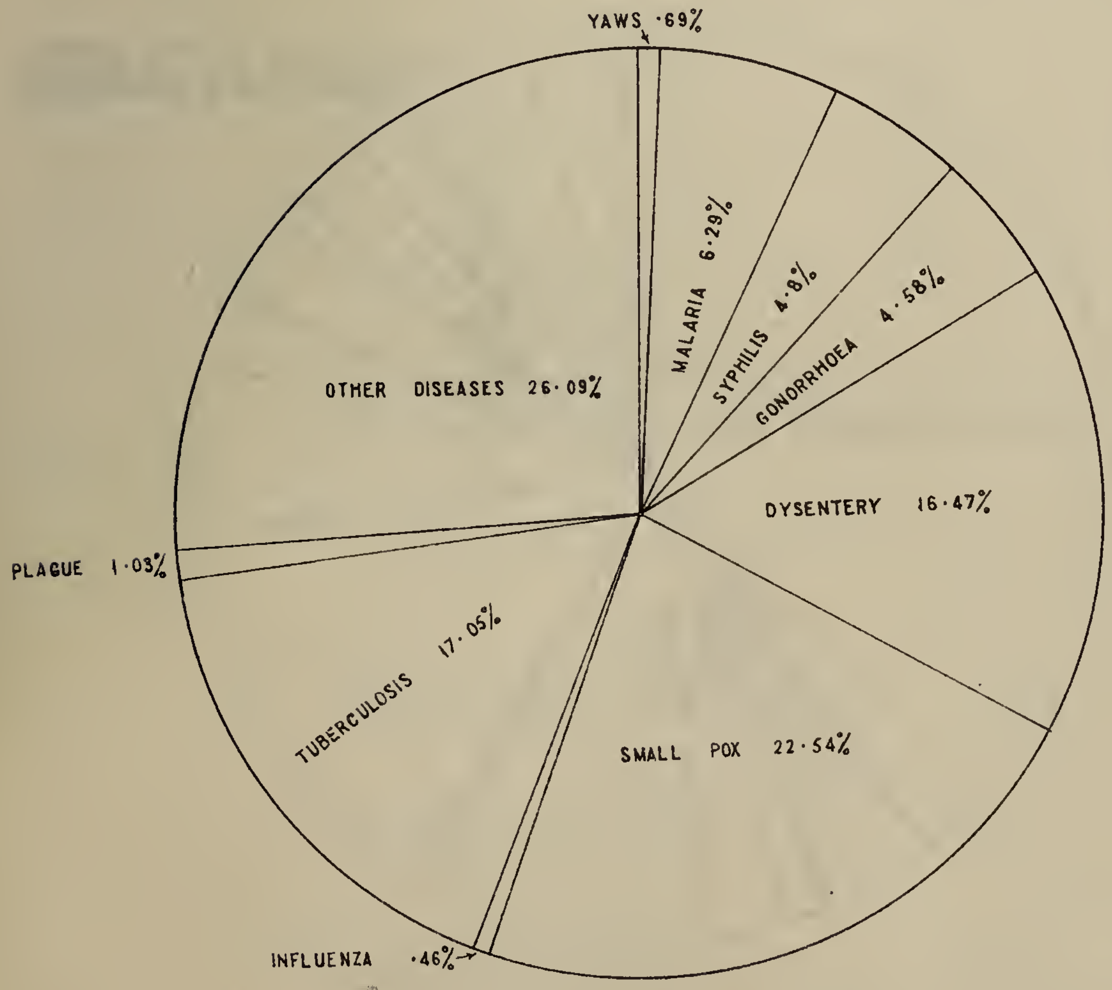
TREATED IN GOVERNMENT INSTITUTIONS

TOTAL CASES 117,111

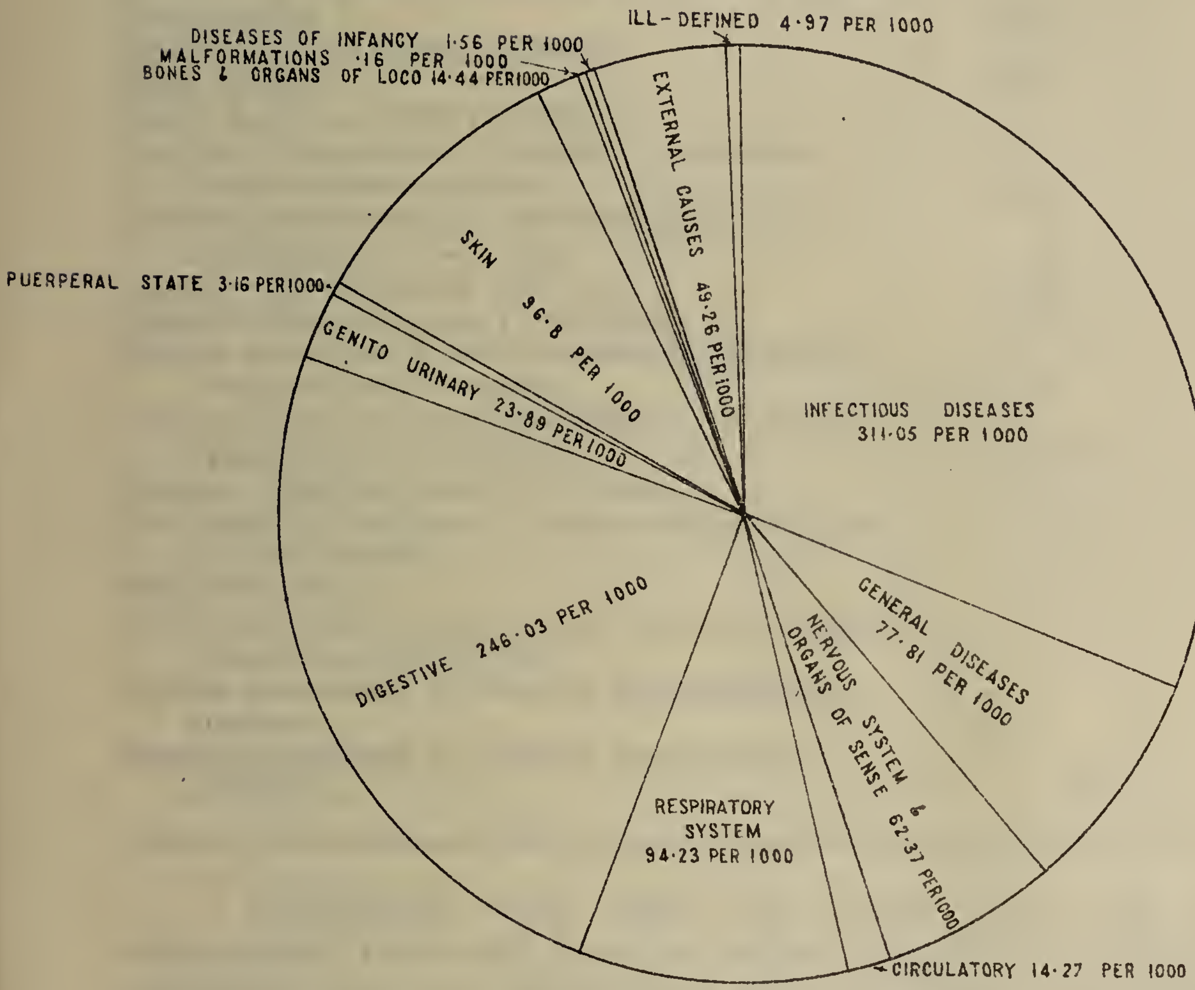
1930



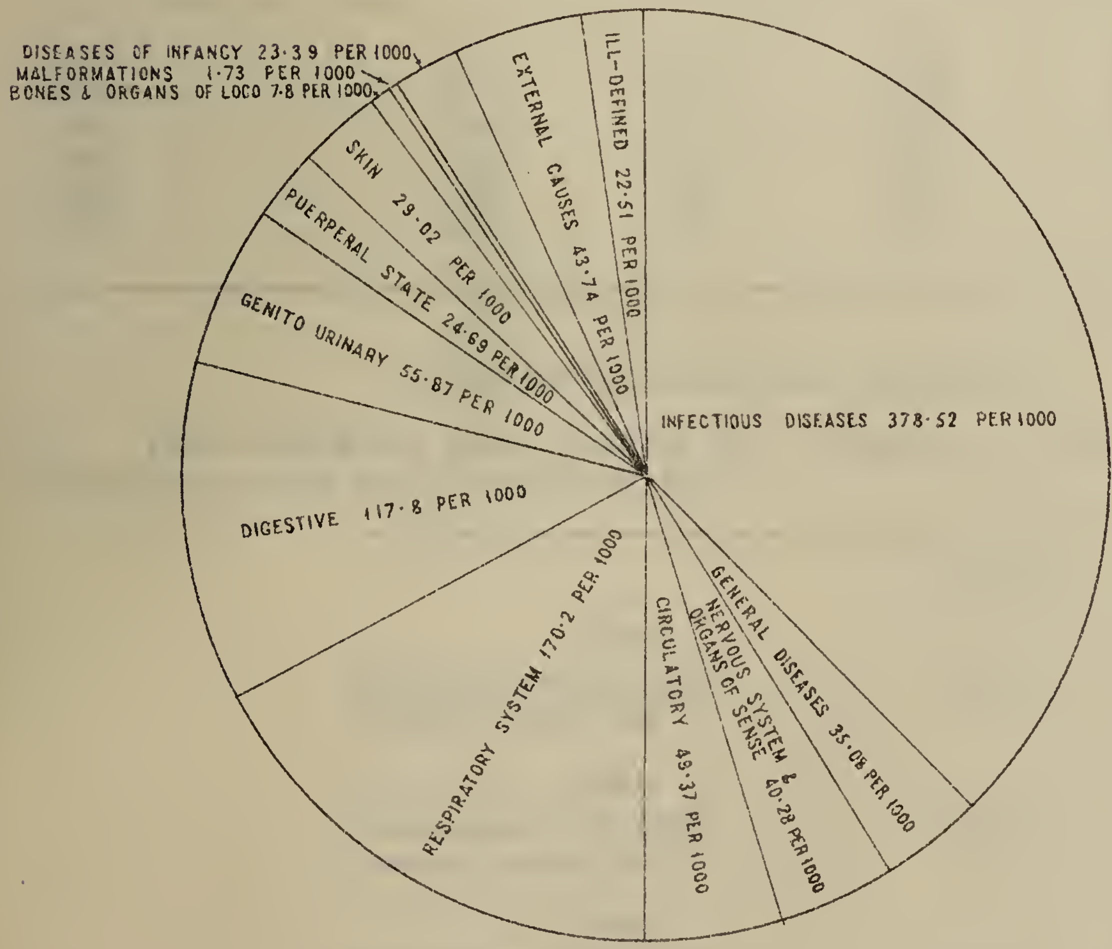
TOTAL DEATHS 874



COMPARATIVE DIAGRAMS
OF
DISEASE GROUPS
TREATED IN GOVERNMENT INSTITUTIONS
1929 & 1930



1929



1930

At present registration is compulsory only at Lagos and Ebute Metta. The vital statistics for this area are summarised in the following table :—

Summary of Vital Statistics for 1930.

	1930.		
	Lagos.	Ebute Metta.	Total.
Estimated Population (Lagos and Ebute Metta)	—	—	122,000
Total Births	2,750	744	3,494
Birth Rate per 1,000 population	—	—	28·6
Total Deaths	1,671	345	2,016
Death Rate per 1,000 population	—	-	16·5
Deaths—Causation of—Certified by Medical Practitioners—number	1,670	345	2,015
Deaths—Causation of—Certified by Medical Practitioners—per cent.	99%	100%	99%
Deaths—Infants under one year	368	83	451
Infantile Mortality per 1,000 births	133·8	111·5	129·07
Deaths under one year—Certified by Medical Practitioners—number	368	83	451
Deaths under one year—Certified by Medical Practitioners—per cent.	22·02%	24·05%	22·3%
Deaths—Children under five years	548	121	669
Percentage of deaths of Children under five years to total deaths	32·7%	35%	33·1%
Total Stillbirths	90	38	128
Stillbirths—proportion per cent. of the total Births (normal and stillbirths)	3·1	4·8	3·5
Deaths uncertified by Medical Practitioners—number	1	–	1
Deaths uncertified by Medical Practitioners—per cent.	·05	—	·04

Compared with 1929 the birth rate has remained almost unchanged, the death rate has fallen from 17.5 to 16.5 per 1,000, the infant mortality rate has fallen from 134.1 to 129.07 per 1,000. The following summary enables comparison to be made with previous years :—

Vital Statistics.

Year.	Total Births.	Birth Rate.	Total Deaths.	Death Rate.	Infant Mortality.
1909	2,576	42·4	2,259	37·2	315
1919	2,517	30·2	2,256	27·0	296
1927	3,305	28·9	2,312	20·2	174·9
1928	3,330	28·1	2,439	20·5	138·1
1929	3,451	28·2	2,141	17·5	134·1
1930	3,494	28·6	2,016	16·5	129·07

(2) General European Population.

The following table shows the estimated European population during the years 1928, 1929 and 1930.

	Totals.
1928.	
Remaining on 31/12/28	5,699
Deaths during 1928	38
1929.	
Remaining on 31/12/29	7,056
Deaths during 1929	33
1930.	
Remaining on 31/12/30	8,249
Deaths during 1930	30

EUROPEAN NON-OFFICIALS.

CAUSES OF INVALIDINGS AND DEATHS.

The number of invalidings of European non-officials in the Government Returns for the year 1930 is fifty-four, as compared with sixty-nine in 1929 :—

Malaria, 9; blackwater fever, 5; dysentery, 1; delusions, 1; neurasthenia, 3; neuralgia, 1; dental caries, 1; duodenal ulcer, 1; pharyngitis, 1; appendicitis, 1; nephritis, 3; synovitis 1; asthenia, 4; pulmonary tuberculosis, 3; carcinoma, 1; abdominal tumour, 1; anaemia, 1; diabetes and diabetes mellitus, 2; paralysis, 1; cardiac, 2; tonsilitis, 1; gastric ulcer, 1; boils, 1; wound, 1; compound fracture, 1; myocarditis, 1; fracture skull, 1; stricture of rectum, 1; acute arthritis, 1; constipation, 1; debility, 1.

The number of deaths among European non-officials is seventeen. The causes are :—

Endocarditis, 3; lobar pneumonia, 2; cardiac valvular disease, 1; yellow fever, 1; unknown cause, 1; scalp wound, 1; malaria subtertian, 1; malaria cachexia, 1; typhoid, 1; cirrhosis of liver, 1; blackwater fever, 2; sunstroke, 1; angina pectoris, 1.

(3) European Officials.

TABLE SHOWING SICK, INVALIDING AND DEATH RATES OF EUROPEAN OFFICIALS FOR 1928, 1929 AND 1930.

	1928.	1929.	1930.
Total number resident	2,853	2,914	2,895
Average number resident	1,990	2,581	2,649
Total number on sick list	1,744	1,550	1,630
Total number of days on sick list	18,241	12,430	12,567
Average daily sick	49·9	34·05	34·4
Percentage of daily sick to average number resident ...	2·4	1·3	1·2
Average number of days on sick list to each patient ...	10·4	8·02	7·7
Average sick time to each resident	6·6	4·2	4·3
Total number invalided	200	207	192
Percentage of invalided to number resident	7·01	7·1	6·6
Percentage of invalided to average number resident	10·05	8·02	7·8
Total deaths	14	15	13
Percentage of deaths to number resident...	·49	·51	·44
Percentage of deaths to average resident	·70	·58	·49

EUROPEAN OFFICIALS—INVALIDINGS AND DEATHS.

Disease.	Invalidings.	Deaths.
Malaria	25	—
Blackwater Fever	2	2
Influenza	1	—
Dysentery Undefined	1	—
Dysentery Amœbic	5	—
Dysentery Bacillary	1	—
Uraemia	-	1
Trypanosomiasis	1	—
Carcinoma	1	—
Tuberculosis	1	—
Gonorrhoeal Arthritis	1	—
Arthritis	4	—
Anæmia	19	—
Alcoholism	2	1
Carried forward	64	4

EUROPEAN OFFICIALS—INVALIDINGS AND DEATHS—*continued.*

Disease.	Invalidings.	Deaths.
Brought forward	64	4
Other Affections:—		
Spinal Cord	1	—
Other Paralysis	1	—
Mental Alienation	3	—
Neuritis	4	—
Neurasthenia	27	—
Other Affections of the Eye	2	—
Myocarditis	1	—
Valvular Disease Heart...	1	2
Angina Pectoris	1	—
Lymphadenitis	1	—
Empyema	1	—
Asthma	2	—
Pyorrhoea	3	—
Tonsillitis	1	—
Ulcer of Duodenum	4	—
Ulcer of Stomach	2	—
Gastritis	5	—
Dyspepsia	2	—
Enteritis	1	—
Colitis	1	—
Ankylostomiasis	1	—
Appendicitis	3	1
Hernia	1	—
Biliary Calculus	1	—
Cholecystitis	1	—
Jaundice	1	—
Peritonitis	—	1
Schistosomiasis	2	—
Perinephritic Abscess	—	1
Pyelitis	3	—
Other affections of Kidney	2	—
Boils	3	—
Carbuncle	2	—
Abscess	2	—
Cellulitis	1	—
Tinea	1	—
Suicide Gas Poisoning	—	1
Under General Anæsthetic	—	1
Effects of Heat	1	1
Lightning Stroke	1	—
Electric Shock	1	—
Local Injury	2	—
Fractured Skull	—	1
Tropical Debility	18	—
Insomnia	6	—
Asthenia	11	—
Total	192	13

RECAPITULATION BY COMPLETED MONTHS OF SERVICE.

Leave conditions.	Under 6 months.	Under 9 months.	Under 12 months.	Under 15 months.	Under 18 months.	Over 18 months.	Total.
New	12	7	14	67	74	6	180
Old	3	3	4	2	—	—	12
Total ...	15	10	18	69	74	6	192

Strength of Officers under New Leave Conditions 2,599
.. .. ,, .. Old ,, ,, ... 296

(4) African Officials.

Table showing Sick, Invaliding and Death Rates of African Officials for 1928, 1929 and 1930.

	1928.	1929.	1930.
Total number resident	3,590	3,796	4,057
Average number resident	3,582	3,682	3,649
Total number on sick list	2,757	4,953	4,725
Total number of days on sick list	20,651	25,841	31,254
Average daily sick	56·5	70·7	85·6
Percentage of daily sick to average number resident	1·5	1·9	2·3
Average number of days on sick list to each patient	7	5	6
Average sick time to each resident	5	6	7
Total number invalided...	58	64	46
Percentage of invalided to number resident ...	1·6	1·6	1·1
Percentage of invalided to average number resident	1·6	1·7	1·2
Total deaths	28	24	33
Percentage of deaths to number resident	·77	·63	·81
Percentage of deaths to average number resident	·77	·65	·90

Summary of the causes of Invalidings and Deaths of African Officials, 1930.

Diseases.	Invalidings.	Deaths.
Amœbic Dysentery	1	—
Aneurism of Aorta	1	—
Arterio-Sclerosis...	1	—
Arthritis	1	—
Asthenia	2	—
Carcinoma of Liver	—	1
Cardiac Disease	4	5
Cerebral softening	1	—
Cerebral Abscess	—	1
Defective Vision	1	—
Epilepsy	1	—
Facial Paralysis	1	—
Hernia	—	1
Influenza	—	1
Leprosy	1	—
Meningitis and T. B. Meningitis	—	2
Mental Alienation	1	—
Mitral Disease	2	—
Myocarditis	6	—
Nephritis and Acute Nephritis	3	2
Neurasthenia	1	—
Neuro-Syphilis	1	—
Optic Neuritis	1	—
Osteitis	1	—
Peritonitis	—	1
Perforating ulcer of foot	1	—
Phthisis	13	1
Pneumonia, Broncho Pneumonia and Lobar Pneumonia	—	12
Pyrexia	—	1
Senility	1	—
Smallpox	—	1
Stricture of Urethra	—	3
Syphilis (Tertiary)	—	1
Total	46	33

(5) *Soldiers—Nigeria Regiment, R.W.A.F.F.*

The following figures show the health of the rank and file of the Royal West African Frontier Force and the Police for 1930:—

Soldiers—Nigeria.

Average daily strength	3,213
Total number on sick list	4,199
Total number of days on sick list	24,292
Average daily sick	11.5
Total number of deaths	26
Death rate per thousand	8.4
The number invalided during the year ...	50

During the previous year (1929) the death rate per thousand was 6.8, and 8.5 in 1928.

(6) *Police Force—Nigeria.*

Average daily strength	3,645
Total number on sick list	3,549
Total number of days on sick list	19,902
Average daily sick	9.7
Total number of deaths	38
Death rate per thousand	10.4
The number invalided during the year ...	38

During 1929 the death rate per thousand was 12.4 in the Northern Provinces and 10.09 in the Southern Provinces, as against 9.2 in the Northern Provinces and 17.6 in the Southern Provinces in 1928.

III.—HYGIENE AND SANITATION.

A.—GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

I.—Preventive Measures.

(1) *Mosquito and Insect-borne Diseases.*

(*a*) *Malaria.*—General anti-malaria work was carried out throughout the year. The Health Service was exceedingly fortunate in having the assistance of Dr. M. A. Barber of the International Health Board, Rockefeller Foundation, who has been carrying on malaria research throughout the whole year. His work has been invaluable and his presence in Nigeria has been of incalculable benefit to the staff both European and African. His reports indicate that in Lagos at any rate very few native children escape infection during their first year of life and it is probable that practically the entire African population in the Lagos area above one year of age is infected with malaria, if not continuously, at least during some period of the year.

The most important malaria carrying mosquito in Lagos is *anopheles gambiæ*, and it is the most adaptable in its habits. In some parts of Lagos the percentage positive was found by Dr. Barber to be as high as twenty-two.

The larvæ of *anopheles gambiæ* have been found to flourish in fresh water and in water containing up to sixty-six *per cent.* of salt water, and almost any natural collection of water exposed to the sun seems to be suitable for them.

Dr. Barber states that observations indicate that *anopheles gambiæ* in Lagos will disperse more than half a mile from their breeding places and it is possible that a portion of the adult mosquitoes caught in Lagos Island, especially in its Northern district, may be coming over from the mainland.

Other anopheles mosquitoes found in Lagos are *A. funestus*, *A. marshalli*, *A. pharoensis*, *A. mauritianus*, *A. obscurus*, and *A. squamosus*.

The anti-malaria work in Lagos has been maintained and extended. The system of ditches at the Obalende swamp has been working satisfactorily and more Opepe trees have been planted.

The ditches at Onikan swamp, Okepa swamp, and the swamps at North-east and South-east Ikoyi have been maintained. Some parts of the last named swamp are so lowlying that drainage is impossible, and breeding is controlled by means of larvicides.

A large amount of useful reclamation work has been effected in the swamp at Oke Suna by using material from the refuse destructor.

At Apapa the extensive system of ditches south of the European Reservation has been maintained and controlled so far as this is possible in face of the continuously shifting conditions entailed by sand-reclamation.

A certain amount of filling and clearing has been done at Ebute Metta. The larvicides used were Paris Green and fuel oil, the latter being mixed with .5 *per cent* of crude castor oil.

Paris Green is used in a one *per cent.* mixture with ordinary road dust, the latter being sifted and the mixture made in special machines.

In Port Harcourt about thirty *per cent.* of the school children examined were found to have malaria parasites in their blood. The chief anopheles found were *A. gambiæ* and *A. umbrosus*. The drainage of the native town is not satisfactory, but a system of earth drains to connect with existing street drains combined with levelling and filling up of roads and lanes has improved matters considerably. Extensive oiling of pools was carried out.

In Abeokuta town anti-malaria work has been taken up on a considerable scale. Extensive reclamation drainage and clearing of bush have been done and a large amount of oiling has been carried out. The anopheles found have been *A. gambiæ*, *A. funestus*, *A. marshalli*, *A. squamosus*, *A. obscurus*, *A. mauritianus* and *A. nili*.

In the Northern Provinces a certain amount of anti-malaria work has been carried out in the bigger townships.

The whole question of malaria and anti-malaria measures in Nigeria requires fuller investigation and it is hoped that it may be possible at an early date to give special training to a Medical Officer of Health for duty as a malariologist.

(*b*) *Yellow Fever.*—Only one case of yellow fever (fatal) was notified during the year. The victim was a Medical Officer of the Rockefeller Yellow Fever Commission who appears to have contracted the disease in the laboratory. Anti-mosquito measures continue to be carried out in Lagos and in the port. A careful survey of over 250 houses scattered all over Lagos Island and Ebute Metta was carried out in November and December and gave a high mosquito breeding index of fifteen *per cent.* In the port 5,355 craft inspections were made and mosquito larvæ were found on twenty-three occasions giving an index of .43 *per cent.*

In the district in Oyo Province reported by the Yellow Fever Commission as an endemic area, and involving the towns of Ife, Oshogbo, Ilesha and Ede, a European Sanitary Inspector is stationed at Oshogbo with small sanitary gangs at the various places. The condition of the towns mentioned remains satisfactory. An important factor in the prevention of yellow fever in the larger Native Administration towns is the provision of ample water supplies.

Anti mosquito work is carried out as a routine practice in some of the towns and townships in Nigeria where there is a sanitary staff, but the work requires extension in the larger Native Administration towns and villages. This will become possible as the trained sanitary staff is increased.

During the year yellow fever was reported from Monrovia (Liberia) one case, Cape Coast Castle (Gold Coast) one case, Abosso (Gold Coast) one case.

(*c*) *Relapsing Fever.*—In Lagos one case of relapsing fever was reported. No cases were reported from the Southern Provinces. In the Northern Provinces a total of 284 cases with twenty-three deaths was reported, chiefly from Katsina Emirate. The Medical Officer of Health, Kano, was dispatched to the border to investigate, treat the infected persons and organize arrangements for the disinfestation of clothing. By the end of the year the outbreak had ceased.

(*d*) *Trypanosomiasis.*—Apart from isolated imported cases trypanosomiasis is not met with to any great extent in the Southern Provinces, but it is a very prominent disease in the Southern Cameroons at and around the port of Tiko. The affected area consists of low lying country with large tracts of coastal mangrove swamp intersected by tidal creeks and, further inland, forest country with thick undergrowth and numerous streams and swamps.

Out of a total of 6,988 persons examined by the Medical Officer, Buea, 234 cases of infection were discovered, a percentage rate of 3.3.

In the Northern Provinces 4,954 cases with sixty-nine deaths were reported. The work of the Sleeping Sickness Staff in the Northern Provinces is described in detail in Appendix B.

(2) *Epidemic Diseases.*

(*a*) *Plague.*—There were sixty-five cases of plague with sixty-six deaths in Lagos during the year under review. The excess of one in the number of deaths is due to a case of bubonic plague which was admitted into the Infectious Diseases Hospital in October 1929, the patient dying of exhaustion in January, 1930.

Of the sixty-five cases, thirty-eight were bubonic, seventeen were pneumonic and ten were septicaemic in type. One case—bubonic—occurred in an infant aged nine months.

The following table shows the number of cases, deaths and case mortality of plague in the last seven years :—

Year.	No. of Cases.	No. of Deaths.	Case Mortality.
1924	414	349	84 3%
1925	104	88	84·6%
1926	497	476	95·8%
1927	155	151	97·4%
1928	519	509	98·0%
1929	188	176	93·6%
1930	65	66	100·0%

The highest number of cases per month was eleven in November whilst February with ten cases came next. October had shown the highest incidence in previous years.

1,136 anti-plague inoculations were performed during the year. The Faji and Agarawu areas of Lagos, which bore the brunt of the epidemic in 1929, showed comparatively few cases in 1930 when more of the human cases occurred in the Northern part of the Island. The areas affected here show probably the worst housing congestion. The Ebute Ero foreshore, where a large food-stuffs market exists, affords an ample food supply for rodents, and it is hoped to have a first class sanitary market here at an early date.

Anti-plague measures were carried out intensively during the year. The total number of rodents destroyed was 125,467, of which 49,469 were black rats, 2,281 brown rats, and the remainder bush rats, mice and shrews.

Out of this large total 250 were found to be positive. Mice are not dissected and no shrews or bush rodents were found to show plague infection. The rat infection during the year showed an average of .55 *per cent.*, the highest month being February when the infection rate was 1.92 *per cent.* and the lowest April when the infection rate was .11 *per cent.* The infection rate during 1929 was .54 *per cent.*

A flea count was made at the Medical Research Institute on the live rats caught. The average number of fleas per rat was found to be 3.6, of which seventy *per cent.* were found to be *X-cheopis* and thirty *per cent. X-brasiliensis.* The highest number of fleas per rat was found in January with an average of six per rat.

Besides rat-destruction other forms of anti-plague operations were carried out. Complete scavenging of the town has been done at least once, and in more congested and insanitary areas, scavenging has been carried out twice and in some cases three times. On the occurrence of a case of plague the whole immediate neighbourhood is scavenged and deratted; in this way the most insanitary and plague infected blocks or groups of streets are returned to time after time. Judging from the Faji area where this repeated scavenging had to be done owing to frequent cases towards the end of 1929, and which has remained comparatively free in 1930, this system of working is apparently not unsound. During the year under review 13,254 premises were scavenged by the anti-plague gangs.

Rat proofing measures were carried out in thirty-two premises.

Extensive house improvement with the provision of improved ventilation, concrete floors, etc., has been carried out in association with the Town Engineer.

The Lagos Executive Development Board is an important executive body and its functions are closely associated with anti-plague work, especially in regard to town improvement and provision of markets.

An important measure, which is expected to be completed early in 1931, is the provision of a large and up to date market at Idumagbo and the making of a wide Avenue from Victoria Street to Idumagbo, thus opening up and improving one of the most congested areas in Lagos. The functions of the Board are also intimately connected with the opening up of the Yaba Estate as an outlet for the excess population in Lagos Island, and the number of plots taken and houses built during the year under review has been most noteworthy and encouraging.

Supervision of canoe as well as of road and railway traffic has been maintained during the year. No case of plague was discovered nor were any infected rats found.

No cases of plague were reported from the mainland during the year. The skeleton of village inspection and sanitation, which was instituted when the large temporary plague organisation was discontinued, still exists and the sanitary condition of the villages remains as a whole quite satisfactory.

(*b*) *Smallpox and Vaccination.*—Outbreaks of smallpox of varying severity were reported from various parts of Nigeria throughout the year.

In Lagos there were eighteen cases with seven deaths. 28,002 vaccinations were carried out; 20,066 were inspected for results and 73.5 *per cent.* were reported as being successful.

Early in the year a fairly extensive outbreak was reported from Bende in the Owerri Province. Actual figures cannot be given, but that the number of cases was fairly high is shown by the incessant demands for vaccination.

In five months 53,744 vaccinations were performed. There was also an outbreak in the Ikot-Ekpene Division of the Calabar Province. Here it was impossible to obtain figures, but it is thought there were over 1,000 cases. Vaccination was extensively carried out.

The vaccinations carried out in the Southern Provinces are reported as follows:—

Total vaccinations	538,428
No. inspected for results	359,434
No. successful	298,293
Percentage successful	83%

In the Northern Provinces smallpox was most prevalent in Benue, Adamawa, Bornu, and Kano Provinces.

A total of 1,153 cases was reported.

The vaccination figures for the Northern Provinces are as follows:—

Total vaccinations	74,079
No. inspected for results	49,078
No. successful	39,482
Percentage successful	80.4%

(*c*) *Enteric Fever.*—No case of enteric fever was reported in Lagos during the year.

In the Northern and Southern Provinces eight cases of typhoid and paratyphoid infections were treated in Europeans and eleven cases in Africans. In addition fourteen cases of enteric infection were treated in Africans in which the type of infection was not determined.

(*d*) *Tuberculosis.*—133 deaths were registered in Lagos as having been caused by tuberculosis of the respiratory organs during the year. Like Plague, tuberculosis is intimately connected with housing conditions. In the absence of some sort of sanatorium or tuberculosis colony it is doubtful how far (if at all) notification would be likely to limit the spread.

The following table taken from the Death Returns gives the incidence of tuberculosis in Lagos during the past ten years.

	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.
Pulmonary	57	74	85	69	72	102	107	163	136	133
Other Forms... ...	8	4	6	23	10	23	53	38	23	17
Total	65	78	91	92	82	125	160	201	159	150
Percentage of Total certified deaths ...	6·1	6·5	8·4	4·9	6·6	5·7	8·7	8·9	7·4	7 2

Tuberculosis must be considerably more common in the Southern Provinces than hospital and dispensary returns would indicate. In the Northern Provinces it does not appear to be a very common disease and only a few cases were reported during the year.

(*e*) *Cerebro-Spinal Fever.*—This disease was present to a certain extent in the Northern Provinces, but in no area did it assume epidemic proportions. It was reported from the Benue Province and spread to the Ogoja Province early in 1930. In all, about ninety cases were reported.

Measures promoted to counter the outbreak included notification and isolation of cases, disinfection, observation and treatment of contacts, closure of main trade routes and general education of the population.

Two cases were reported in Lagos during the year.

(*f*) *Rabies.*—Although no case of human rabies has been reported, four cases of rabies in dogs in Lagos were notified and persons who were bitten by these dogs have received treatment locally with anti-rabic vaccine. Four Europeans and one African in all were treated during the year.

An important achievement during the year was the completion of the Infectious Diseases Hospital at Yaba, which was officially opened by Sir Frank Baddeley, the Chief Secretary to the Government. The new hospital is a very great improvement on the old Infectious Diseases Hospital at Ikoyi.

In connection with the provision of Infectious Diseases Hospitals in the Provinces, it was not considered advisable to erect elaborate buildings, and what has been aimed at has been the provision of concrete plinths 20′ x 40′ with a galvanized roof and angle iron supports, so that when necessary sides of grass or matting can be put up which can be burned when they become dilapidated. They are very cheap and effective.

(*g*) *Helminthic Diseases.*—In the course of routine medical examination of school children in Lagos, out of 1,227 children examined, 913 were found to have ascaris, 569 ascaris and hook worm whilst various other cases had eggs of *Trichocephalus dispar* and/or *Strongyloides* in their stools.

In the Southern Provinces, Guinea worm is met with, but it is not commonly encountered in the Provinces to the East of the Niger.

Guinea worm is especially common in the dry Northern areas.

Ankylostomiasis is prevalent throughout the Southern Provinces and the Cameroons and there are few stations which do not show signs of infection. Although the discovery of infection amongst the European staff employed in the coal mines at Enugu at one time suggested excessive incidence in underground workers, it would appear that the proportion of mine workers affected does not exceed that of the general population.

Although cases of schistosomiasis are not often reported, investigations go to prove that the infection is probably more common and widespread than is generally believed.

The Medical Officer of Health, Abeokuta, examined urine samples from 104 Scholars of the local Grammar School and 53.8 *per cent.* of the specimens were found to contain ova of *Schistosoma haematobium.* It is reported as being very common amongst the school-boys of the various large boarding schools of the Northern Provinces.

II.—GENERAL MEASURES OF SANITATION.

(*a*) *Sewage Disposal.*—The general methods of sewage disposal remain the same throughout Nigeria. In townships the ordinary system is the dry-earth latrine. Every endeavour is being made to introduce more sanitary conservancy methods into Native Administration towns and villages, but the area is so extensive and the population so large that progress is slow. Whenever possible European Sanitary Inspectors are sent into the villages to train the people in proper sanitary methods.

(*b*) *Scavenging and Refuse Disposal.*—In Lagos a certain amount of fresh, untreated refuse still has to be dumped without burning at the height of the rains. Two additional cells are to be added to the present destructor.

38,331 tons of refuse were burnt in Lagos during 1930. In the mainland portion of the Lagos Township, the system of temporary open incinerators continues to work satisfactorily.

Wherever staff is available Sanitary Inspectors are sent into the towns and villages to instruct the inhabitants in the construction, use and benefits of simple incinerators.

Considerable progress in this educative work has been made by the staff of Ijebu-Ode, Oyo, and Abeokuta Provinces.

(*c*) *Drainage and Reclamation.*—Anti-malaria drainage in Lagos has been already dealt with. The ashes from the destructor and the incinerators are utilised for raising the level of numerous depressed areas.

Few permanent drains have been constructed during the year, but considerable lengths of earth ditches have been cut in and about various townships.

(*d*) *Water Supply.*—The water supply for Lagos from the Iju source has been satisfactory. Chlorination of the water has been carried out since the early part of the year, from .3 to 1.5 parts of chlorine per million parts of water being added according to season.

A complete scheme for an improved and augmented water supply for Abeokuta has been prepared and awaits approval. The present supply is inadequate and is of doubtful purity.

Many of the water supply schemes now in operation are in need of extension or alteration of a more or less comprehensive nature, and investigations for this purpose have been made at Jos, Zaria, Sokoto, Benin, Ibadan, Port Harcourt and Oshogbo. A supply at Onitsha has just been completed.

The Kaduna supply is now in full operation and the Kano supply is expected to be opened at the beginning of 1931.

(*e*) *Offensive Trades.*—Soap making on a large scale is carried out at Apapa. Hide and skin drying is done on a considerable scale at Apapa and Ebute Metta, but both sites are more or less isolated. Small tanneries in Lagos are tolerated if kept clean.

In the Provinces, in order to safeguard residents in commercial and residential areas, the following restrictive clauses dealing with fellmongering are now inserted in all Certificates of Occupancy :—

(1) Not to cause any nuisance outside the fellmongering area.

(2) To take such measures as the Medical Officer of Health may consider necessary for the disposal of effluents and waste-products and for the prevention of contamination of the public water supply.

In all new layouts the area in which fellmongering is permitted is limited and defined.

(*f*) *Clearance of Bush and Undergrowth.*—Clearance is carried out at all stations as far as possible with the funds available.

(*g*) *Sanitary Inspections.*—During the year the majority of the large towns and townships were inspected by the Deputy Director of Health Service or the Senior Health Officers of the Northern or Southern Provinces. Routine inspection is carried out in the townships by African sanitary inspectors supervised by the European Staff.

In Lagos 12,667 notices to abate nuisances were served, of which 8,588 were complied with. As a result, 2,853 new windows were constructed, 1,360 overhanging roofs and verandahs, and 1,524 rooms obstructing light and ventilation to main premises were removed, and 2,032 concrete floors were laid.

In Native Administration areas outside townships where the Public Health Ordinance does not apply except with special authority, the Health Officers and Sanitary Inspectors act in an advisory capacity working in close co-operation with the Administrative Officers.

III.—School Hygiene.

The necessity for the routine medical examination of school children has been recognised, and during the year a full time Medical Officer of Health with a European Nursing Sister has been detailed in Lagos for this work.

The school clinics are held in two places—at Ereko Dispensary for the North end of the town and the Medical Headquarters building in Broad Street for schools in the Southern half of Lagos Island.

In Lagos 1,461 school boys and 750 school girls were examined medically in the course of the year. Out of a total of 2,211 children examined, 148 had contagious scalp infections, 403 showed other contagious skin infections, 164 showed defective vision, 316 had enlarged tonsils, 323 had urinary abnormalities and 1,641 showed evidence of intestinal parasites.

In Abeokuta, the Medical Officer of Health has carried out special investigations in regard to schistosomiasis, ankylostomiasis and malaria. Urine samples were taken from 104 boys of the Grammar School of Abeokuta and 53.8 contained ova of *Schistosoma haematobium*. In an examination of a girl's school in Abeokuta 78.9 *per cent.* showed malaria parasites.

An examination of 608 school children has shown spleen enlargements varying from 13.1 *per cent.* in August to 7.8 *per cent.* in December.

Routine school inspection has also been commenced at Ibadan and during the coming year it is hoped to extend it to Port Harcourt and Aba.

The Medical Officer of Health, Ibadan, states that the development and nutrition of both boys and girls in Ibadan are under the standard of children in schools in England. Their weight is less on an average and their general nutrition is not good.

Skin diseases were found in 4.7 *per cent.* of the children examined.

Of the total number of children inspected during the year palpable spleens were found in 35.6 *per cent.* as follows:—

One finger breadth	18.5%
two finger breadths	12.3%
Three or more	4.8%

The number of microscopic examinations for intestinal parasites was 158. A very high percentage of infection with *ascaris lumbricoides* was found. In one school eighty-eight *per cent.* of the specimens showed ova.

Ankylostoma duodenale was found in twelve *per cent.*

In a microscopic examination of the urine of 180 children, infection with *Schistosoma haematobium* was found in twenty-three *per cent.* of cases.

Owing to shortage of staff it has not yet been possible to commence systematic inspection of all school children.

IV.—LABOUR CONDITIONS.

There is no contract or indentured labour in Nigeria. The conditions under which the labourers serve in the plantations in the Cameroons under British Mandate, which have been declared Labour Health Areas under the Labour Ordinance, continue to be satisfactory.

V.—HOUSING AND TOWN PLANNING.

In Lagos the improvement of insanitary dwellings has been maintained and, provided the strict control of the contravention of the building bye-laws is kept up, the cases calling for abatement notices requiring alterations should become progressively fewer.

All town planning of Lagos is in the hands of the Lagos Executive Development Board and their activities are chiefly directed towards improving the insanitary areas in Lagos according to the recommendations of the Town Planning Officer, and the development of the Yaba Estate on the mainland.

Judging from the number of plans submitted for approval, private building on the Yaba Estate is developing satisfactorily, thereby relieving the present congestion in Lagos Island.

In Port Harcourt, the labourers lines present an ever present problem to the authorities and an outstanding instance of gross overcrowding. It is hoped that assistance may be received from the Colonial Development Fund.

All Government stations are laid out according to plans.

One of the chief duties of the Health Service in the extension of sanitation into the Native Administration areas is advising the people on laying out towns and villages. Control of this section of health activity can result in excellent work of permanent value.

VI.—FOOD IN RELATION TO HEALTH AND DISEASE.

Routine examination of food-stuffs forms part of the regular duties of sanitary inspectors, European and African.

In Lagos the present slaughter house is not satisfactory, and it is hoped at an early date to have an abattoir erected on up-to-date lines. Meat was inspected daily.

Food sold in markets, stores, and in the streets was also inspected, resulting in the destruction of twenty-one bags of rice, forty-five loaves of bread, two and half barrels and ninety-one tins of biscuits, eight bags of farina, one barrel of salt beef and 130 lb. of decomposing meat.

The conditions of bakehouses in Lagos continue to improve as the worst cases are weeded out, and new bakeries of an approved type are built.

There are two aerated water factories. Samples of their products are collected weekly and examined. The results are on the whole satisfactory.

A new market has been opened at Ebute Metta. The meat stalls are screened against flies.

In most townships the number of market sheds of permanent structure has been increased and in general cleaner conditions of sale of food have been attained.

The abattoirs in Zaria and Kaduna townships are now in use and on the whole the conditions under which food is sold in townships are fair.

Considerable improvement has been accomplished in the Zaria City Market where a large new native built market is nearing completion.

B.—MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

Sanitary Inspectors are encouraged to take the opportunity during routine inspections of explaining health principles to house holders.

Leaflets in English and Vernacular are distributed in Lagos in the course of Infant Welfare work and when houses have been disinfected for tuberculosis.

Elementary Hygiene is taught in all Government and grant assisted schools as part of the ordinary curriculum, the usual text books in use being those compiled by Evans and Blacklock.

A Health Week was held in Calabar during the year and arrangements have been made for Health Week Exhibitions to be held in Lagos and Kano in 1931.

In Abeokuta posters were procured by the Native Administration from the Health and Cleanliness Council, the Council of Maternity and Child Welfare Centres and the National Association for the prevention of Tuberculosis.

In Kano the Medical Officer of Health gives public health lectures to the inhabitants of the township.

The extension of health work and the development of a " health conscience " by instruction and demonstration amongst the people of Nigeria, especially in the densely populated Native Administration areas, is considered to be one of the most important fields of development to which the activities of the Health Service should be directed, and it is particularly unfortunate that owing to financial stringency it is not possible to increase the staff of the Health section for this most important branch of sanitary work.

As a rule the activities of a Medical Officer of Health cover the whole of the Province in which he is stationed and he works in close association with the Native Administration and Administrative Officers.

C.—TRAINING OF SANITARY PERSONNEL.

The training of an efficient staff of African Sanitary Inspectors, both Government and Native Administration, is realised as being most important for the extension of sanitation in Nigeria.

A training school has been in existence in Lagos for some years where Government and Town Council Sanitary Inspectors have been trained and also by special arrangement a few from Native Administration areas. The average number in training during the year was forty. An important step in the training of Sanitary personnel was the decision of the Royal Sanitary Institute approved by the Secretary of State to form a Local Board of Examiners of the Royal Sanitary Institute. The syllabus of training for Sanitary Inspectors was brought into line with the syllabus of the Institute with certain alterations in regard to local laws.

The first examination was held in Lagos in July, the papers being prepared locally. The examination consisted of written, oral, and practical questions. Thirty-four candidates sat, of which thirty-two were from Nigeria, one from Sierra Leone, and one from the Gold Coast. The standard reached was reasonably satisfactory, and six of the candidates (three Government and three Town Council) satisfied the examiners as being competent for the office of Sanitary Inspector in British West Africa.

Dr. W. Allan met Dr. Fenton and Dr. Robinson at the Royal Sanitary Institute when on leave and went over the papers with them. They were of opinion that the general standard of the papers was high and they expressed themselves as satisfied with the manner in which the examination had been conducted.

It is hoped to hold the next examination in 1933.

A training school for Sanitary Inspectors has been opened at Kano during the year. The buildings, equipment, etc., are not satisfactory, but it is hoped that it may be possible to extend the present buildings at an early date. The school here is for Sanitary Inspectors in the Northern Provinces, Government and Native Administration. It is not intended that for a time the standard of teaching should be so high as in Lagos.

It is hoped in the near future to open Training Schools for Native Administration Sanitary Inspectors at Aba and Ibadan.

D.—RECOMMENDATION FOR FUTURE WORK.

1. Extension of sanitation into the large towns and villages of the Native Administrations. Impossible without increase of staff.
2. Extension of water supplies to all large towns.
3. Extension of infant welfare and medical inspection of school children.
4. Investigation into malaria in different parts of Nigeria and the appointment of a Malariologist for this work.
5. Health propaganda with the aid of locally made cinema films.

IV.—PORT HEALTH WORK AND ORGANISATION.

Lagos.—The port of Lagos still remains the chief port of Nigeria and is the only one which possesses the equipment and personnel necessary for the deratisation of ships and the issue of deratisation certificates under the International Sanitary Convention.

The establishment in Lagos consists of :—

The Port Health Officer.
Two European Sanitary Inspectors.
Three African Sanitary Inspectors.
One African female attendant.
One African Vaccinator.
One African Caretaker.
One African 2nd Class Clerk.
Six Ratcatchers.
Twenty labourers and two headmen.

Systematic deratting of vessels entering the port is carried out and all rodents recovered are sent to the dissecting station for examination. One case of rat plague was discovered on board the s.s. *Baltu,* which arrived in the port on the 6th of August. Full fumigation and deratting were carried out, but no more infected rats were found. Apart from ocean going vessels, all coastal vessels and permanent harbour craft are periodically fumigated.

Besides fumigation of ships the activities of the port of health organisation are directed towards mosquito breeding on craft, wharves, and foreshore.

During the year 879 ships entered the port and 878 cleared. The number of ships fumigated totalled 32, tugs 8, and lighters 101.

Port Harcourt.—Here all incoming ships are inspected and Deck Passengers are examined and vaccinated if necessary. 491 ships entered the harbour and 489 cleared. 4,221 outgoing passengers and 3,338 incoming passengers were examined. 1,232 vaccinations were carried out. No case of infectious disease was discovered.

Calabar.—The Medical Officer of Health boarded and cleared all vessels arriving in this port. Altogether 246 vessels were cleared and passengers examined. No case of infectious disease was discovered.

W. H. PEACOCK,

Deputy Director of Health Service.

V.—MATERNITY AND CHILD WELFARE.

The Midwives Ordinance was passed in 1930 and will become law early in 1931.

During the year 362 in-patients and 8,182 out-patients were treated at the Massey Street Maternity Hospital, Lagos, for women and children. 153 cases of normal labour and thirty-two cases of abnormal or complicated labour were admitted. In order to increase the scope of this hospital a large light room, designed as an operating theatre, was converted into a children's ward.

A large ward in the new African Hospital at Lagos has been opened as a children's ward.

At Lagos, infant welfare work is under the control of the Town Council. The Lady Medical Officer resigned during the year and the work has been carried on by a European Nursing Sister under the direction of the Medical Officer of Health.

Infant clinics have been held regularly on Mondays, Wednesdays, and Fridays at Massey Street Dispensary, and on Tuesdays at Denton Street Dispensary, Ebute Metta. Details of attendances are as follows :—

	Lagos.	*Ebute Metta.*	*Totals.*
Total Attendances	1,589	529	2,118
Cases referred for treatment at Massey Street Dispensary	290	114	404
Cases referred for treatment to African Hospital ...	2	2	4

Of the total of 2,118 women attending, 1,473 were engaged in trade.

Visits were arranged from time to time to show mothers round the maternity and children's wards at Massey Street. Cases were referred for medical treatment on account of malaria, cough, bronchitis, skin diseases, conjunctivitis, ophthalmia neonatorum, whooping cough, boils, rickets, fractures, worms, marasmus, adenitis, and poisoning by native medicine. The blood of 141 infants suspected to have malaria was examined by the Pathologist, who reported parasites present in seventy-two of these cases.

Two cases of ophthalmia neonatorum in Lagos and one in Ebute Metta were referred for medical treatment.

FOOD DEMONSTRATION.

Three food demonstrations showing which foods are suitable and which unsuitable for babies at various ages were arranged during the year.

A baby show under the auspices of the Ladies League was held in November.

HEALTH VISITING.

A list of newly born babies is supplied by the Registrar of Vital Statistics each day to enable such cases to be visited as early as possible by the health visitors.

3,490 new cases were visited during the year and the total visits paid were 27,563.

At the Government section of the Sacred Heart Hospital at Abeokuta 405 in-patients and 1,325 out-patients were treated, of which forty-six were cases of normal labour and sixty-nine were cases of abnormal or complicated labour.

The Welfare Centre organised by the Egba Native Administration at Abeokuta, in charge of Miss McCotter has continued to be much appreciated :—

New cases seen	3,048
Attendances	68,598
Confinements in District ...	44

A Welfare Scheme started by the Church Missionary Society in Benin is making progress, 318 patients being seen during the year.

The experiment of commencing maternity and child welfare work in the Northern Provinces at Kano and Katsina, mentioned in the Report for 1929, was delayed by various causes. The women's ward at Kano was opened early in June under the charge of a Nursing Sister. The Senior Medical Officer reports that a most encouraging response is being made, sixty in-patients and 409 out-patients being treated in the last half of the year.

At Katsina building operations were delayed and although a Lady Medical Officer was posted in May very little work could be done for some time. From July to December the average number of in-patients increased from eighteen to twenty-eight and during this period 765 out-patients were treated. Much visiting of women in the compounds of the Emir and other influential people was done. General medical work forms the bulk of the work and it will be some time before maternity work can be carried out to any extent, but a fair number of children were brought to the welfare centre.

The new maternity ward which is being built at the Church Missionary Society Hospital at Iyi Enu near Onitsha is nearing completion. Child welfare work bulks largely in the work of the Primitive Methodist Hospital, Amachara, the Wesleyan Mission at Ilesha, the Baptist Mission at Ogbomosho, the Qua Iboe Mission at Etinan and the United Free Church of Scotland Mission at Itu.

At all the Government African Hospitals throughout the country, more particularly those to which European Nursing Sisters are posted, it is encouraging to see the steadily increasing numbers of women and children who are attending.

VI.—HOSPITALS AND DISPENSARIES.

In the Northern Provinces the new ward for better class patients, the maternity ward and the irrigation room have been opened at Kaduna African Hospital. The new African Hospital at Zaria is nearing completion. A Medical Officer was posted to Mubi in the Mandated Territory of the Cameroons where a Dispensary was opened, but this officer had to be removed towards the end of the year owing to shortage of staff. A much needed new African Hospital is in process of construction at Bauchi, and a new Hospital is being built by the Native Administration at Pankshin in the Plateau Province. A new Hospital, built partly from Government and partly from Native Administration funds, was opened at Bida in Niger Province, and this will form the base hospital for medical treatment for the Nupe tribes.

In the Southern Provinces three new wards of the new Hospital at Abeokuta were opened. The new country type Hospital at Akure in Ondo Province is nearing completion and will provide accommodation for thirty-six patients. A new ward built by the Native Administration was completed at Ikot-Ekpene, providing extra accommodation for thirty patients. The work at Ijebu Ode African Hospital has increased greatly since the posting of an European Nursing Sister there. A new ward built by the Native Administration was opened at the Ogoja African Hospital. Two wards built by the Native Administration at Onitsha Hospital, providing extra accommodation for forty patients, were opened. At Victoria in the Cameroons Province a new hospital was opened for

European patients, providing also accommodation for two Nursing Sisters, and the old European Hospital is now used for African women and children. An operating theatre was completed at the Sapele Hospital. New Medical stations were opened at Buea, Owerri and Umudiki, and a new X-Ray apparatus was installed at Port Harcourt.

At Lagos the new African Hospital is being completed rapidly upon a simplified plan, using semi-permanent materials. When completed it will provide accommodation for 360 patients. The five new two-storied permanent wards with accommodation for 200 patients were occupied towards the end of the year.

Reference has been made in Section II to the dispensary system financed by the Native Administrations. Splendid progress has been made and it is hoped to open 160 dispensaries during 1931. The locality distribution of these dispensaries is shown upon the map which accompanies this report.

MEDICAL WORK OF RELIGIOUS MISSIONS.

Although the medical work of Missions in Nigeria still lags behind the work which is being undertaken in the Belgian Congo and in East Africa much good work has been done.

Figures indicating the work accomplished have been courteously supplied by Mission Directors and are summarised below :—

MEDICAL WORK OF MISSIONS.

Mission.	No. of Stations.	Doctors.	Holders of Dispenser's Permit.	Hospitals.	Dispensaries.	Nature of Work.			Cases treated.	Total attendance.	Remarks.
						Medical.	Leprosy.	Infant Welfare and Maternity.			
A. NORTHERN PROVINCES.									(Approx.)		
Church Missionary Society.	7	1	...	1	...	1	1	Some	620	...	Hospital at Zaria.
Sudan Interior Mission	25	1	12	...	23	23	5	2	6,813	77,575	
Sudan United Misssion	27	2	7	1	18	19	2	4	14,061	99,584	Hospital at Vom.
United Missionary Society.	7	...	1	...	4	4	...	...	994	11,958	
Dutch Reformed Church	5	1	...	1	4	5	2	Some	7,116	163,578 (Approx.)	Hospital at Mkar.
Christian Mission in many lands.	3	...	1	...	1	1	1	...	5,857	18,681	
Church of the Brethern Mission.	3	3	...	1	2	3	1	...	1,751	50,855	Sixty bed Hospital at Garkidi.
Primitive Methodist Church.	1	...	...	...	1	1	...	...	...	...	Injection for yaws.
Seven Day Adventist ...	1	...	...	...	...	...	...	...	...	...	No information.
B. SOUTHERN PROVINCES.											
Catholic Sacred Heart Hospital, Abeokuta.	1	...	...	1	...	1	...	1	?	?	One Lady Medical Officer at Government Section of Hospital for Maternity Work.
Baptist Mission ...	1	3	...	1	3	1	Some	1	829 (in-patients)	25,926	Hospital at Ogbomosho, twenty beds.
Wesleyan Mission ...	1	1	...	1	...	1	1	1	3,267	24,925	Hospital at Ilesha, twenty-four beds.
Church Missionary Society.	1	2	1	1	...	1	...	1	1,092 (in-patients)	30,495	Hospital at Iyi Enu, seventy beds. New Maternity Hospital nearing completion.
United Free Church of Scotland Mission.	1	1	...	1	...	...	1	...	...	...	Leper Settlement at Itu. Average 700 patients resident.
Primitive Methodist Mission.	...	1	...	3	13	3	...	...	4,337	19,738	Hospitals at Ifa (eighteen beds), Ikot-Ekpene (twenty beds), Amachara thirty beds.
Qua Ibo Mission. ...	...	1	11	1	10	11	Some	...	6,578	3,500	Hospital at Etinan Oyo, twenty-eight beds.

DENTAL REPORT.

The Government Dentist, Mr. Cunningham, reports as follows upon his work in the Northern Provinces :—

From April to September I was on leave in England. Kaduna and Jos had my services during the other months of the year, Kaduna having 122 days and Jos sixty-one days.

I show below a chart of work done.

CHART.

	Fillings.	Temporary Fillings.	Extractions.	Scalings.	Root Treatment.	Crowns.	Repairs to Dentures.	Part Dentures.	Full Dentures.	Attendances for treatment.
European Officials	214	118	56	100	22	1	18	6	7	339
African Officials and Wives ...	8	9	50	5	...	...	3	21	...	96
Grand Total ...	222	127	106	105	22	1	21	27	7	435

The Government Dentist, Mr. Pearson, reports upon his work in the Southern Provinces :—

Dental treatment for the year ending December 31st, 1930, was curtailed owing to my leave and only includes work done from January to April and from the middle of September to the end of December.

I regret that my suggestion for a third Dental Surgeon to work in the Eastern Provinces has not been approved owing to the financial situation. This appointment would ensure that one Dental Surgeon could always be in Lagos, the capital and Port of the Colony, where there is ample work to be done at all times.

The Dental Surgery was moved to the first floor in the East wing of the new Medical Office in October 1930. The suite of Rooms allotted is ideal for a Dental Department, being light, airy and spacious but unfortunately somewhat noisy. As was expected there was some slight inconvenience to the patients due to the move to the new Surgery. Time has now solved this question.

The number of European Officials treated has increased and seems to be increasing each year.

The most striking fact is that more patients are presenting themselves for conservation treatment before all hope of restoration has vanished. In spite of this, there is however still too high a percentage of radical treatment.

The number of African Officials attending for Dental Treatment is far below the numbers in past years. Unfortunately they do not realise the importance of early treatment. The most notable cases have been a case of triple fracture of the mandible and one simple fracture of the maxilla. The former was treated by means of a gunning splint, the latter united without the aid of a splint. There have been as usual a few cases of impacted third mandibular molars.

Every now and then one comes across a case of supernumerary teeth in African patients and also an extra premolar in the mandible. It is to be hoped that more Africans will take advantage of Dental Treatment.

Figures of work done :—

European officials	190
Native officials	60
Wives and children	15

Figures of the work :—

Synthetic fillings	85
Amalgams	150
Copper amalgams	20
Gutta percha (temporary fillings)	195
Gutta percha (permanent fillings)	19
Scalings	250
General suppurative cervical periodontitis	100
Dentures and repairs	76

RAILWAY CONSTRUCTION.

JANUARY 1ST, 1930 TO AUGUST 15TH, 1930.

The health of Europeans has been good. No death has occurred during 1930.

EUROPEANS ADMITTED DURING 1930.

Eropean Hospital Lagos	2
,, ,, Kaduna	1
,, ,, Kano	1
Treated in quarters	2

EUROPEAN OUT-PATIENTS.

Railway Construction Officials	32
Other Officials	4
Non-Officials	6
Total attendances	147

INVALIDINGS—EUROPEAN.

One Arthritis following on Malaria and acute Rheumatism.

MAIN DISEASES—IN-PATIENTS.

Duodenal Ulcer and Appendicitis	1
Hepatitis	1
Arthritis	1
Concussion of Spinal Column	1

MAIN DISEASES—OUT-PATIENTS.

Malaria	1
Enteritis	1
Urithritis	6
Cellulitis	5
Burns	1
Lipoma	1

There was one Railway accident occurring to a European during 1930—Concussion of spinal column due to a Trolley accident.

AFRICANS.

Total number of In-patients	178
Total number of Deaths	17

MAIN DISEASES.

Syphilis	13
Pneumonia	18
External Injuries	37
Accidents—Major	3

OUT-PATIENTS.

Total treated	4,501
Total attendances	33,433

NUMBER OF OPERATIONS PERFORMED.

Major	4
Minor	12

Number of Intravenous injections given = 256.

There were periodic outbreaks of smallpox in Labour Camps in January, February and April, 1930, which caused some anxiety. There were twenty-six in-patients with five deaths. An Isolation Hospital was built to accommodate these cases.

SURGICAL OPERATIONS, 1930.

Nature of Operation.	Total.	Cured.	Relieved.	Unrelieved.	Died.
A. GENERAL.					
Amputations	139	116	9	...	14
Appendectomy	54	47	...	...	7
Bubonocele R. Cure ...	135	131	3	...	1
Fractures Plated, etc. ...	51	43	4	1	3
Herniotomy	1,580	1,508	16	6	50
Hepatic Abscess (Drainage, etc.)	24	15	3	2	4
Laparotomy	65	35	7	1	22
Perforated Gastric Ulcer (Suture)	...	...	...	...	...
Perforated Duodenal Ulcer (Suture)	2	2	...	...	...
Hæmorrhoids (Radical Cure)...	73	70	2	...	1
Colotomy	1	...	...	...	1
Excision, Benign Tumours and Cysts	943	929	8	...	6
Excision (Malignant Tumours)	123	98	6	...	19
Excision Glands	47	45	2	...	...
Excision Breast	4	4	...	...	...
Enterectomy	10	3	...	...	7
Sequestrotomy	172	146	22	4	...
Osteotomy	26	21	5	...	...
Trephining	2	1	...	...	1
Splenectomy	6	3	...	...	3
Cholecystomy	3	3	...	...	...
Curettage General ...	1,369	1,244	87	35	3
Skin Grafting	176	137	17	22	...
Thoractomy	3	1	1	...	1
Tonsillectomy	10	10	...	...	...
Thyroidectomy	18	13	2	...	3
Omentopexy	3	2	1	...	...
Ischio Rectal Abscess ...	5	5	...	...	...
Other operations	90	60	9	...	21
B. EYES.					
Cataract	20	18	2	...	...
Enucleation	15	8	7	...	...
Iridectomy	2	...	2	...	...
Other operations	54	50	3	1	...
C. EAR.					
Mastoid Schwartze operation	11	7	3	...	1
Other operations	10	10	...	...	...
D. GENITO URINARY, MALE.					
External Urethrotomy ...	64	42	17	...	5
Internal Urethrotomy ...	16	12	3	...	1
Dilation of Stricture ...	423	256	165	...	2
Elephantiasis of Scrotum ...	194	182	4	...	8
Hydrocele (Radical Cure) ...	430	422	2	...	6
Varicocele	1	1	...	...	...
Circumcision	845	842	...	...	3
Cystotomy	26	17	7	...	2
Orchidectomy	26	23	3	...	...
Tumour of Bladder ...	1	1	...	...	...
Other operations	23	7	15	...	1
Carried forward ...	7,295	6,610	437	72	196

SURGICAL OPERATIONS, 1930—*continued.*

Nature of Operation.	Total.	Cured.	Relieved.	Unrelieved.	Died.
Brought forward ...	7,295	6,610	437	72	196
E. GENITO URINARY, FEMALE.					
Abdominal Hysterectomy ...	25	18	4	...	3
Elephantiasis	18	18	...	...	...
Ovariotomy	29	27	...	...	2
Salpingectomy	19	11	1	...	7
Hysteropexy	14	14	...	...	...
Perineorraphy	12	7	4	...	1
Endometritis (Curettage) ...	157	115	35	2	5
Colporrhaphy	4	4	...	...	...
Other operations	105	93	6	1	5
F. OBSTETRICAL.					
Abortion—Curettage ..	34	31	...	...	3
Forceps Extraction ...	90	81	2	...	7
Podalic Version	7	4	...	...	3
Craniotomy	1	...	...	...	1
Ectopic Gestation ...	5	4	...	...	1
Cæsarian Section	5	1	...	...	4
Retained Placenta (Currettage)	3	3	...	...	...
Other operations	40	25	4	...	11
G. MINOR SURGICAL OPERATIONS.					
Abscesses, General Injuries, etc.	8,335	7,939	272	38	86
Totals	16,198	14,985	765	113	335

VII.—PRISONS AND ASYLUMS.

The following figures give a general idea of the health of prisoners in Government prisons during the year 1930 :—

	Northern Provinces.		Southern Provinces.	
	1929.	1930.	1929.	1930.
Average daily number in Prison ...	601	563	6,745	7,173
Total number on sick list	333	425	19,564	22,479
Total number of days on sick list ...	3,629	3,551	45,153	68,930
Average daily sick	·91	1·1	53·6	61·5
Total number of deaths	13	10	163	153
Death rate per thousand	21·6	17·7	24·1	21·3

The following table shows the causes of deaths :—

Northern Provinces.	
Acute Polyserositis ...	1
Amoebic Dysentery ...	2
Chronic Interstitial Nephritis ...	1
Epilepsy and Debility ...	1
Generalised Septicaemia ...	1
Heart Failure	2
Myocarditis	1
Pneumonia	1
Total	10

Southern Provinces.	
Accident	3
Anaemia	1
Arterio Sclerosis	1
Bronchitis	4
Carcinoma Pancreas ...	1
Carcinoma Rectum	1
Cardiac Failure	6
Cellulitis	2
Cerebral Hæmorrhage ...	3
Cerebral Malaria	1
Cerebro-Myelitis	1
Cerebral Thrombosis ...	1
Cystitis	2
Diarrhoea	13
Dysentery	23
Empyema	2
Enteritis	4
Epilepsy	3
Fatty Emboliom of the Heart ...	1
Carried forward ...	73
Brought forward ...	73
Fibrotic Tumour	1
Filariasis	1
General Debility	1
Gastric Ulcer	1
Hernia Strangulated ...	2
Hodgkin's Disease ...	1
Influenza	1
Mania and Exhaustion ...	3
Meningitis	1
Misadventure	1
Myocarditis	2
Natural Causes	1
Nephritis	3
Oedema	2
Paralysis	1
Paralysis of the bowels ...	1
Pneumonia	24
Pulmonary Tuberculosis ...	5
Rheumatism	1
Ruptured Spleen	1
Ruptured Cyst of Kidney ...	1
Senility	1
Sepsis	1
Septicaemia	4
Small-pox	5
Splenomedullary Leucaemia ...	1
Tetanus	1
Thrombosis	1
Toxaemia	2
Toxic Jaundice	1
Ulcerative Colitis	2
Uraemia	5
Syncope	1
Total	153

VIII.—METEOROLOGY.

Tables showing comparatively monthly rainfall for Lagos and meteorological returns of various stations for 1930 are appended.

IX.—SCIENTIFIC.

The Annual Reports of the Laboratory Service, Tsetse Investigation. Radiologist, Superintendent of Medical and Pharmacy Schools, appear as appendices.

W. B. JOHNSON,
Director of Medical and Sanitary Service.

RETURNS.

TABLE 1.

FINANCIAL.

I.—Expenditure.

(*a*).—PERSONAL EMOLUMENTS.

(1) MEDICAL.

Administrative Officers	£205,865
Specialists	
Senior Medical Officers	
Medical Officers (European and African) ...	
Dental Surgeon	
European Nursing Staff	
Clerical Staff	
Dispensers and African Nursing Staff ...	
Other Items under Personal Emoluments ...	

(2) HEALTH

Administrative Officers	£51,673
Health Officers	
European Sanitary Inspectors	
African Sanitary Inspectors	
Other Items under Personal Emoluments ...	

(3) LABORATORY.

European Staff	£12,987
African Staff	

(*b*)—OTHER CHARGES.

(1) MEDICAL.

	£
Railway Transport	7,035
Medical, Surgical, Dental and X-Ray Equipment and Supplies	30,420
Diets, Provisions and Necessaries... ...	19,693
Other Items under Other Charges ...	51,822
	£108,970

SPECIAL EXPENDITURE.

	£
Tsetse Fly Investigation	19,237
Hospital Equipment	2,726
Other Items under Special Expenditure...	3,587
	£25,550

(2) HEALTH.

	£
Railway Transport	1,953
General Sanitary	33,198
Other Items under Other Charges ...	21,999
Special Expenditure:—	
Plague Expenses	10,352
Other Items under Special Expenditure	1,096
	£68,598

(3) LABORATORY.

	£
Railway Transport	128
Other Items under Other Charges ...	5,160
	£5,288

	£
TOTAL, MEDICAL AND SANITARY EXPENDITURE	460,656
TOTAL LABORATORY EXPENDITURE	18,275
	£478,931

II.—Receipts.

	£	s.	d.
Hospital and Medical Receipts	10,786	0	0
Births and Deaths	13	12	0
	£10,799	12	0

TABLE II.—INTER DEPARTMENTAL SERVICES.

RECEIPTS AND EXPENDITURE, MEDICAL DEPARTMENT, FOR THE YEAR 1930.

RECEIPTS.	£	s.	d.
Hospitals and Medical Receipts for the year 1930	10,799	12	0
Grant from the Medical Research Council ...	500	0	0
Medical charges against the Nigerian Railway ...	30,120	10	0
Sanitary charges against the Nigerian Railway ...	1,269	3	3
Excess of Expenditure over Receipts	453,002	15	9
	£495,692	1	0

EXPENDITURE.	£	s.	d.
Marine Services to Medical and Sanitary Department	1,331	6	5
Electric Light	3,291	7	3
Water	841	10	0
Railway Services	11,296	17	4
Total Personal Emoluments, Medical, Sanitary and Research	270,525	0	0
Total other Charges, Medical, Sanitary and Research	208,406	0	0
	£495,692	1	0

COMPARATIVE MONTHLY RAINFALL—LAGOS, 1920–1930.

Month.	YEAR.										
	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.	1930.
January	0·37	0·31	0·59	0·89	1·94	1·50	...	2·49	1·77	·02	1·38
February	0·11	0·02	0·81	1·22	1·12	0·40	3·01	2·35	2·22	1·46	2·21
March	3·78	3·42	1·50	2·60	5·28	6·61	2·74	2·78	8·20	1·73	3·27
April	5·71	4·81	7·42	6·43	7·55	7·00	12·76	3·37	6·96	7·04	5·01
May	8·91	21·55	8·13	13·55	3·45	12·16	13·69	8·19	15·33	11·34	8·61
June...	14·97	15·34	26·36	25·08	5·53	20·40	13·06	7·08	21·05	24·79	13·28
July	9·55	16·86	2·75	10·44	2·48	15·22	10·07	8·57	2·53	19·93	18·40
August	1·36	3·53	5·73	0·12	0·10	1·28	0·26	0·25	2·05	·81	·66
September	0·45	7·94	11·32	3·15	4·10	5·98	11·05	3·04	5·60	3·11	2·67
October	5·06	3·74	15·40	5·36	15·62	2·98	3·79	13·33	12·67	6·03	12·46
November	2·79	3·35	3·51	2·72	0·83	2·87	5·47	2·38	·54	4·10	1·88
December	0·04	2·35	0·85	...	1·92	...	0·07	1·17	·13	6·02	1·69
Total	53·10	83·22	84·37	71·56	49·92	76·40	75·97	55·00	79·05	86·38	71·52

TABLE III.

Meteorological Returns for 1930.

STATION.	Absolute Shade Max.	Absolute Shade Min.	Average Max.	Average Min.	Relative Humidity.	Rainfall inches.
	°		°			
Ilorin	97·8	60·7	91·1	70·2	87·7	47·06
Kaduna	94·3	55·6	88·5	63·1	73·9	57·98
Maiduguri	107·3	54·1	96·0	65·0	58·4	29·06
Kano	104·6	53·5	94·0	67·3	48·9	39·19
Lokoja	98·1	67·5	95·0	72·9	82·3	51·79
Yola	102·8	64·5	94·1	71·8	72·3	35·70
Lagos	92·6	71·5	86·9	75·4	79·7	71·52
Ibadan	96·7	68·6	87·4	72·4	79·2	53·40
Calabar	90·2	69·3	87·0	71·8	88·6	106·58
Enugu	92·1	69·4	87·7	72·2	88·6	72·31

TABLE IV.

RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL. Admissions.	TOTAL. Deaths.	Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
I.—*Epidemic, Endemic, and Infectious Diseases.*								
1. Enteric Group—								
(*a*) Typhoid Fever ...	...	4	1	4	...	1	...	...
(*b*) Paratyphoid A. ...	...	1	...	1	...	...	1	...
(*c*) Paratyphoid B. ...	...	...	...	...	...	1	...	...
(*d*) Type not defined ...	...	...	...	...	...	...	...	...
2. Typhus	...	...	...	...	...	...	...	...
3. Relapsing Fever	...	...	...	...	...	...	...	...
4. Undulant Fever	...	...	...	...	...	...	...	...
5. Malaria—								
(*a*) Tertian	...	12	1	12	1	52	6	...
(*b*) Quartan	...	1	...	1	...	...	...	...
(*c*) Aestivo-autumnal ...	4	381	...	385	12	784	94	...
(*d*) Cachexia	...	1	1	1	...	69	3	...
(*e*) Blackwater ...	...	9	3	9	...	8	...	1
6. Smallpox	...	...	...	...	...	1	...	...
Alastrim	...	1	...	1	...	...	...	...
7. Measles	...	2	...	2	...	6	6	...
8. Scarlet Fever	...	...	...	...	...	...	...	...
9. Whooping Cough	...	...	...	...	...	1	...	...
10. Diphtheria	...	...	...	...	...	...	...	...
11. Influenza	1	47	...	48	...	135	29	...
12. Miliary Fever	...	...	...	...	...	2	...	...
13. Mumps	...	1	...	1	...	2	...	...
14. Cholera	...	...	...	...	...	...	...	...
15. Epidemic diarrhoea ...	...	...	...	...	...	...	...	...
16. Dysentery—								
(*a*) Amœbic	1	55	...	56	...	98	10	...
(*b*) Bacillary	1	22	...	23	1	7	2	...
(*c*) Undefined or due to other causes ...	...	5	...	5	...	14	3	...
17. Plague—								
(*a*) Bubonic	...	...	...	...	...	...	...	...
(*b*) Pneumonic ...	...	...	...	...	...	...	...	...
(*c*) Septicaemic ...	...	...	...	...	...	...	...	...
(*d*) Undefined	...	...	...	...	...	...	...	...
18. Yellow Fever	...	1	1	1	...	...	...	...
19. Spirochætosis ictero-hæmorrhagica ...	...	...	...	...	...	...	...	...
20. Leprosy	...	...	...	...	...	...	...	...
21. Erysipelas	...	...	...	...	...	1	...	...
22. Acute Poliomyelitis ...	...	1	...	1	...	...	...	...
23. Encephalitis Lethargica ...	...	...	...	...	...	...	...	...
24. Epidemic Cerebro-spinal Fever	...	...	...	...	...	...	...	...
25. Other Epidemic Diseases—								
(*a*) Rubeola (German Measles)	...	3	...	3	...	15	6	...
(*b*) Varicella (Chicken-pox)	...	1	...	1	...	6	...	...
(*c*) Kala-azar	...	...	...	...	...	...	...	...
(*d*) Phlebotomus Fever ...	...	...	...	...	...	1	...	...
(*e*) Dengue	...	3	...	3	...	3	4	...
Carried forward ...	7	551	7	558	14	1,207	164	1

Table IV.—Return of Diseases and Deaths (European) for the year 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total. Admissions.	Total. Deaths.	Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths
Brought forward ...	7	551	7	558	14	1,207	164	1
I.—*Epidemic, Endemic, and Infectious Diseases*—contd.								
Other Epidemic Diseases—								
(*f*) Epidemic Dropsy ...	...	...	...	...	...	...	...	...
(*g*) Yaws	...	...	...	...	...	2	...	...
(*h*) Trypanosomiasis ...	...	2	...	2	...	2	...	...
(*i*) Filariasis	...	...	...	...	...	3	...	...
26. Glanders	...	...	...	...	...	...	...	...
27. Anthrax	...	...	...	...	...	...	...	...
28. Rabies	...	...	...	...	...	5	...	...
29. Tetanus	...	...	...	...	...	...	...	...
30. Mycosis	...	...	...	...	...	...	...	...
31. Tuberculosis, Pulmonary and Laryngeal	...	2	...	2	...	4	...	...
32. Tuberculosis of the Meninges or Central Nervous System	...	...	...	...	...	...	...	...
33. Tuberculosis of the Intestines or Peritoneum	...	...	...	...	...	...	...	...
34. Tuberculosis of the Vertebral Column	...	...	...	...	...	...	...	...
35. Tuberculosis of Bones and Joints	...	...	...	...	...	...	...	...
36. Tuberculosis of other organs—								
(*a*) Skin or Subcutaneous Tissue (Lupus) ...	...	...	...	...	...	...	...	...
(*b*) Bones	...	...	...	...	...	...	...	...
(*c*) Lymphatic System ...	...	...	...	...	...	...	...	...
(*d*) Genito-urinary ...	...	...	...	...	...	2	...	...
(*e*) Other Organs ...	...	...	...	...	...	...	...	...
37. Tuberculosis disseminated—								
(*a*) Acute	...	...	...	...	...	...	...	...
(*b*) Chronic	...	...	...	...	...	...	...	...
38. Syphilis—								
(*a*) Primary	...	3	...	3	...	44	...	...
(*b*) Secondary	1	3	...	4	...	17	...	...
(*c*) Tertiary	...	1	...	1	...	18	...	...
(*d*) Hereditary... ...	...	...	...	...	...	...	...	...
(*e*) Period not indicated ...	...	1	...	1	...	4	...	...
39. Soft Chancre	...	1	...	1	...	26	...	...
40. A.—Gonorrhœa and its complications	...	7	...	7	...	167	...	...
B.—Gonorrhœal Ophthalmia	...	...	...	...	...	...	...	...
C.—Gonorrhœal Arthritis ...	...	2	...	2	...	1	...	...
D.—Granuloma Venereum ...	...	...	...	...	...	...	...	...
41. Septicaemia	...	...	...	...	...	2	...	...
42. Other Infectious Diseases ...	...	...	...	...	...	1	...	...
II.—*General Diseases not mentioned above.*								
43. Cancer or other malignant Tumours of the Buccal Cavity	...	...	...	...	...	...	...	...
Carried forward ...	8	573	7	581	14	1,505	164	1

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	8	573	7	581	14	1,505	164	1
II.—*General Diseases not mentioned above*—contd.								
44. Cancer or other malignant Tumours of the Stomach or Liver	...	...	...	...	...	1	...	...
45. Cancer or other malignant Tumours of the Peritoneum intestines, Rectum	...	1	...	1	...	...	...	...
46. Cancer or other malignant Tumours of the Female Genital Organs	...	1	...	1	...	...	...	...
47. Cancer or other malignant Tumours of the Breast ...	...	...	...	...	...	...	...	...
48. Cancer or other malignant Tumours of the Skin ...	...	...	...	...	...	...	...	...
49. Cancer or other malignant Tumours of Organs not specified	...	...	...	...	...	...	...	...
50. Tumours non-Malignant ...	...	6	1	6	...	31	1	...
51. Acute Rheumatism	...	8	...	8	...	72	6	...
52. Chronic Rheumatism	...	4	...	4	...	100	8	...
53. Scurvy (including Barlow's Disease)	...	...	...	...	...	...	...	...
54. Pellagra	...	...	...	...	...	...	...	...
55. Beri-Beri	...	...	...	...	...	...	...	...
56. Rickets	...	...	...	...	...	...	...	...
57. Diabetes (not including Insipidus)	...	4	...	4	...	2	...	...
58. Anæmia—								
(*a*). Pernicious	...	...	...	...	...	25	3	...
(*b*) Other Anæmias and Chlorosis	...	9	1	9	...	134	22	...
59. Diseases of the Pituitary Body	...	...	...	...	...	...	...	...
60. Diseases of the Thyroid Gland—								
(*a*) Exophthalmic Goitre ...	...	...	...	...	...	...	...	...
(*b*) Other diseases of the Thyroid Gland, Myxœdema	...	...	...	...	...	...	...	...
61. Diseases of the Para-Thyroid Glands...	...	...	...	...	...	...	...	...
62. Diseases of the Thymus ...	...	...	...	...	...	...	...	...
63. Diseases of the Supra-Renal Glands	...	...	...	...	...	...	...	...
64. Diseases of the Spleen ...	...	...	...	...	...	2	...	...
65. Leukæmia—								
(*a*) Leukæmia	...	...	...	...	...	...	...	..
(*b*) Hodgkin's Disease ...	...	...	...	...	...	...	...	...
66. Alcoholism	...	5	...	5	...	4	...	...
67. Chronic poisoning by mineral substances (lead, mercury, &c.)	...	...	...	...	...	1	...	...
68. Chronic poisoning by organic substances (Morphia, Cocaine, &c.)	...	...	...	...	...	...	...	...
Carried forward	8	611	9	619	14	1,877	204	1

Table IV.—Return of Diseases and Deaths (European) for the year 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	8	611	9	619	14	1,877	204	1
II.—*General Diseases not mentioned above*—contd.								
69. Other General Diseases—								
Auto-intoxication	1	3	...	4	...	2	...	...
Purpura Hæmorrhagica ...	...	2	...	2	...	1	...	...
Hæmophilia	...	1	...	1	...	1	...	...
Diabetes Insipidus	...	2	...	2	...	...	1	...
III.—*Affections of the Nervous System and Organs of the Senses.*								
70. Encephalitis (not including Encephalitis Lethargica) ...	...	...	...	...	...	...	...	...
71. Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Meningitis)	...	...	...	...	...	...	...	...
72. Locomotor Ataxia	...	1	...	1	...	1	...	...
73. Other affections of the Spinal Cord	...	1	...	1	...	...	1	...
74. Apoplexy—								
(*a*) Hæmorrhage	...	..	...	...	...	...	...	...
(*b*) Embolism	...	...	...	...	...	...	...	...
(*c*) Thrombosis	...	...	...	...	...	...	...	...
75. Paralysis—								
(*a*) Hemiplegia	...	...	...	...	...	...	...	...
(*b*) Other Paralyses ...	...	2	...	2	...	2	...	...
76. General Paralysis of the Insane	...	...	...	...	...	...	...	...
77. Other forms of mental Alienation	...	4	...	4	...	3	...	...
78. Epilepsy	...	1	...	1	...	1	...	...
79. Eclampsia, Convulsions (non-puerperal) 5 years or over ...	...	...	...	...	...	...	...	...
80. Infantile Convulsions	...	...	...	...	...	1	...	...
81. Chorea	...	...	...	...	...	...	...	...
82. A.—Hysteria	...	...	...	...	...	4	4	...
B.—Neuritis	...	10	...	10	...	62	12	...
C.—Neurasthenia	1	22	...	23	...	71	10	...
83. Cerebral Softening	...	...	...	...	...	4	...	...
84. Other affections of the Nervous System, such as Paralysis Agitans	1	1	...	2	...	12	1	...
85. Affections of the Organs of Vision—								
(*a*) Diseases of the eye ...	...	1	...	1	...	3	1	...
(*b*) Conjunctivitis	...	2	...	2	...	39	2	...
(*c*) Trachoma	...	...	...	...	...	...	...	...
(*d*) Tumours of the Eye ...	...	...	...	...	...	...	...	...
(*e*) Other affections of the Eye	...	4	...	4	1	37	2	...
86. Affections of the Ear or Mastoid Sinus	1	7	...	8	1	255	12	...
Carried forward	12	675	9	687	16	2,376	250	1

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward ...	12	675	9	687	16	2,376	250	1
IV.—*Affections of the Circulatory System*								
87. Pericarditis	...	...	...	..	...	...	...	...
88. Acute Endocarditis or Myocarditis	...	3	3	3	...	...	...	...
89. Angina Pectoris	...	...	...	...	...	4	...	1
90. Other Diseases of the Heart—								
(*a*) Valvular	...	2	1	2	...	2	...	...
Mitral	...	4	...	4	...	3	1	...
Aortic	...	4	1	4	...	6	1	...
Tricuspid	...	...	...	...	...	...	...	...
Pulmonary	...	...	...	...	...	...	...	...
(*b*) Myocarditis	...	4	1	4	...	5	...	...
91. Diseases of the Arteries—								
(*a*) Aneurism	...	...	...	...	...	...	...	...
(*b*) Arterio-Sclerosis ...	...	1	...	1	...	5	...	...
(*c*) Other diseases ...	...	...	...	...	...	...	...	...
92. Embolism or Thrombosis (non-cerebral)	...	...	...	...	...	...	...	...
93. Diseases of the Veins—								
Hæmorrhoids... ...	...	9	...	9	...	48	5	...
Varicose Veins... ..	...	...	...	...	...	15	2	...
Phlebitis	...	...	...	...	...	1	...	...
94. Diseases of the Lymphatic System—								
Lymphangitis... ...	...	5	...	5	...	16	...	...
Lymphadenitis, Bubo (non-specific)	...	18	...	18	...	54	5	...
95. Hæmorrhage of undetermined cause	...	...	...	...	...	2	...	...
96. Other affections of the Circulatory System	...	1	...	1	...	1	1	...
V.—*Affections of the Respiratory System.*								
97. Diseases of the Nasal Passages—								
Adenoids	...	1	...	1	...	...	...	...
Polypus	...	...	..	...	...	...	...	...
Rhinitis	...	4	...	4	1	24	...	...
Coryza	...	7	...	7	...	153	13	...
Others	...	...	...	...	...	1	...	...
98. Affections of the Larynx— Laryngitis	...	...	...	...	...	42	5	...
99. Bronchitis—								
(*a*) Acute	1	11	...	12	...	174	12	...
(*b*) Chronic	...	1	...	1	...	36	1	...
100. Broncho-Pneumonia ...	...	1	...	1	...	3	...	...
101. Pneumonia—								
(*a*) Lobar	1	3	1	4	...	...	...	...
(*b*) Unclassified ...	...	1	1	1	...	1	...	...
102. Pleurisy, Empyema ..	1	3	...	4	1	24	1	...
103. Congestion of the Lungs ...	...	...	...	...	...	...	...	...
104. Gangrene of the Lungs ...	...	...	...	...	...	...	...	...
105. Asthma	...	4	...	4	...	25	3	...
106. Pulmonary Emphysema ...	...	1	...	1	...	...	...	...
107. Other affections of the Lungs— Pulmonary Spirochætosis ...	...	...	...	...	...	4	...	...
Carried forward ...	15	763	17	778	18	3,025	300	2

Table IV.—Return of Diseases and Deaths (European) for the year 1930—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	15	763	17	778	18	3,025	300	2
VI.—*Diseases of the Digestive System.*								
108. A.—Diseases of Teeth or Gums—								
Caries, Pyorrhœa, &c. ...	...	9	...	9	...	243	26	...
B.—Other affections of the Mouth—								
Stomatitis	...	3	...	3	...	25	4	...
Glossitis, &c.	...	...	...	...	...	5	...	..
109. Affections of the Pharynx or Tonsils—								
Tonsillitis	...	24	...	24	...	119	25	...
Pharyngitis	...	8	...	8	...	91	6	...
110. Affections of the Œsophagus ...	...	...	...	...	...	...	...	...
111. A.—Ulcer of the Stomach ...	...	7	...	7	...	2	...	...
B.—Ulcer of the Duodenum ...	...	10	...	10	...	15	...	...
112. Other affections of the Stomach—								
Gastritis	...	37	...	37	...	239	17	...
Dyspepsia, &c.	...	24	...	24	...	258	33	...
113. Diarrhœa and Enteritis—								
Under two years	...	5	...	5	...	71	4	...
114. Diarrhœa and Enteritis—								
Two years and over ...	...	16	...	16	1	203	22	...
Colitis	...	23	...	23	...	54	7	...
Ulceration	...	...	...	...	...	...	...	...
114a. Sprue	...	...	...	...	...	...	...	...
115. Ankylostomiasis	...	...	...	...	...	2	1	...
116. Diseases due to Intestinal Parasites—								
(*a*) Cestoda (Tænia) ...	...	1	...	1	...	6	2	...
(*b*) Trematoda (Flukes) ...	...	...	...	...	...	...	...	...
(*c*) Nematoda (other than Ankylostoma)— ...	...	...	...	...	...	2	...	...
Ascaris	...	4	...	4	...	7	2	...
Trichocephalus dispar	...	...	...	...	...	...	...	...
Trichina	...	...	...	...	...	...	...	...
Dracunculus ...	...	1	...	1	...	2	...	...
Strongylus	...	...	...	...	...	...	...	...
Oxyuris	...	1	...	1	...	...	1	...
(*d*) Coccidia	...	...	...	...	...	2	...	...
(*e*) Other parasites ...	...	...	...	...	...	4	...	...
(*f*) Unclassified	...	...	...	...	...	8	1	...
117. Appendicitis	2	48	3	50	2	34	3	...
118. Hernia	...	2	...	2	...	11	3	...
119. A.—Affections of the Anus, Fistula, &c.	...	5	...	5	...	8	...	...
B.—Other affections of the Intestines—								
Enteroptosis	...	...	...	...	...	1	...	...
Constipation	...	7	...	7	...	87	9	...
Others	...	...	...	...	...	1	...	...
120. Acute Yellow Atrophy of the Liver	...	...	...	...	...	...	...	...
121. Hydatid of the Liver	...	...	...	...	...	...	...	...
Carried forward	17	998	20	1,015	21	4,525	466	2

Table IV.—Return of Diseases and Deaths (European) for the year 1930—*continued*.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	17	998	20	1,015	21	4,525	466	2
VI.—*Diseases of the Digestive System*—continued.								
122. Cirrhosis of the Liver—								
(*a*) Alcoholic	...	..	...	...	...	1	...	...
(*b*) Other forms	...	2	1	2	...	...	...	...
123. Biliary Calculus	...	1	...	1	...	...	...	...
124. Other affections of the Liver—								
Abscess	...	...	...	...	...	...	...	...
Hepatitis	1	9	...	10	...	18	...	...
Cholecystitis...	...	5	...	5	1	2	2	...
Jaundice	1	10	..	11	1	7	...	...
125. Diseases of the Pancreas ...	...	...	...	...	...	5	1	...
126. Peritonitis (of unknown cause)	...	...	...	...	...	...	...	...
127. Other affections of the Digestive System	...	1	...	1	...	3	...	...
VII.—*Diseases of the Genito-urinary System (non-Venereal).*								
128. Acute Nephritis	...	1	...	1	...	5	...	...
129. Chronic	...	1	...	1	...	1	...	...
130. A.—Chyluria	...	...	...	...	...	...	...	...
B.—Schistosomiasis	...	2	...	2	...	3	...	...
131. Other affections of the Kidneys—								
Pyelitis, &c.	1	19	...	20	...	20	6	...
132. Urinary Calculus	...	...	...	...	...	7	...	...
133. Diseases of the Bladder—								
Cystitis	...	13	...	13	1	64	14	...
134. Diseases of the Urethra—								
(*a*) Stricture	...	1	...	1	...	24	...	...
(*b*) Other	1	8	...	9	...	62	1	...
135. Diseases of the Prostate—								
Hypertrophy	...	...	...	...	...	...	...	...
Prostatitis	1	...	...	1	...	15	...	...
136. Diseases (non-Venereal) of the Genital Organs of Man—								
Epididymitis	...	3	...	3	...	11	...	...
Orchitis	...	3	...	3	...	8	...	...
Hydrocele	...	...	...	...	...	1	...	...
Ulcer of Penis	...	3	...	3	1	14	...	...
Others	...	...	...	...	...	2	...	...
137 Cysts or other non-malignant Tumours of the Ovaries ...	...	...	...	...	...	...	1	...
138. Salpingitis—								
Abscess of the Pelvis ...	...	...	...	...	...	...	...	...
139. Uterine Tumours (non-malignant)	...	2	...	2	...	...	1	...
140. Uterine Hæmorrhage (non-puerperal)	...	4	...	4	...	...	1	...
141. A.—Metritis	...	3	...	3	1	...	1	...
B.—Other affections of the Female Genital Organs—								
Displacements of Uterus ...	...	1	...	1	...	...	5	...
Amenorrhoea	...	2	...	2	...	...	8	...
Dysmenorrhœa	...	...	...	...	...	...	11	...
Leucorrhœa	...	...	...	...	...	...	2	...
Others	...	1	...	1	...	...	1	...
Carried forward	22	1,093	21	1,115	26	4,798	521	2

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	22	1,093	21	1,115	26	4,798	521	2
VII.—*Diseases of the Genito-urinary System (non-Venereal)*—contd.								
142. Diseases of the Breast (non-puerperal)—								
Mastitis	...	...	...	...	...	3	2	...
Abscess of Breast	...	...	...	...	...	...	...	...
VIII.—*Puerperal State.*								
143. A.—Normal Labour	...	2	...	2	...	...	5	...
B.—Accidents of Pregnancy—								
(*a*) Abortion	...	4	...	4	...	...	5	...
(*b*) Ectopic Gestation ...	...	...	...	...	...	...	...	...
(*c*) Other accidents of Pregnancy	...	3	...	3	..	...	14	...
144. Puerperal Hæmorrhage ...	...	...	...	...	...	...	...	...
145. Other accidents of Parturition	...	...	...	...	...	...	1	...
146. Puerperal Septicæmia	...	...	...	...	...	...	...	...
147. Phlegmasia Dolens	...	...	...	...	...	...	...	...
148. Puerperal Eclampsia	...	...	...	...	...	...	...	...
149. Sequelæ of Labour	...	...	...	...	...	...	...	...
150. Puerperal affections of the Breast	...	...	...	...	...	...	1	...
IX.—*Affections of the Skin and Cellular Tissues.*								
151. Gangrene	...	1	...	1	...	6	1	...
152. Boil	...	21	...	21	...	210	11	...
Carbuncle	...	16	...	16	2	56	3	...
153. Abscess	3	24	...	27	1	66	3	...
Whitlow	1	5	...	6	...	44	4	...
Cellulitis	...	40	...	40	4	116	10	...
154. A.—Tinea	...	4	...	4	...	213	5	...
B.—Scabies	...	2	...	2	...	33	2	...
155. Other Diseases of the Skin—								
Brythema	...	2	...	2	...	19	1	...
Urticaria	...	3	...	3	...	57	14	...
Eczema	1	6	...	7	...	176	23	...
Herpes	...	1	...	1	...	33	7	...
Psoriasis	...	...	...	...	...	4	...	...
Elephantiasis	...	...	...	...	...	3	...	...
Myiasis	...	1	...	1	...	15	4	...
Chigoes	...	...	...	...	...	12	2	...
Cutaneous Leishmaniasis ...	...	...	...	...	...	1	1	...
Others	...	12	...	12	...	138	9	...
X.—*Diseases of Bones and Organs of Locomotion (other than Tuberculous).*								
156. Diseases of Bones—								
Osteitis	...	3	...	3	1	7	...	...
157. Diseases of Joints—								
Arthritis	...	8	...	8	1	32	4	...
Synovitis	...	5	...	5	...	44	1	...
158. Other Diseases of Bones or Organs of Locomotion ...	...	4	...	4	...	38	1	...
Carried forward	27	1,260	21	1,287	35	6,124	655	2

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	27	1,260	21	1,287	35	6,124	655	2
XI.—*Malformations.*								
159. Malformations—								
Hydrocephalus	...	...	...	...	...	...	...	...
Hypospadias...	...	...	...	...	...	...	...	...
Spina Bifida, etc.	...	...	...	...	...	...	...	...
XII—*Diseases of Infancy.*								
160. Congenital Debility	...	1	...	1	...	11	...	...
161. Premature Birth	...	...	...	...	...	...	...	...
162. Other affections of infancy ...	...	...	...	...	...	...	...	...
163. Infant neglect (infants of three months or over) ...	...	...	...	...	...	...	...	...
XIII.—*Affections of Old Age.*								
164. Senility—								
Senile Dementia	...	...	...	...	...	...	...	..
XIV.—*Affections produced by External Causes.*								
165. Suicide by Poisoning	...	...	...	...	...	...	...	...
166. Corrosive Poisoning (Intentional)	...	...	...	...	...	...	...	...
167. Suicide by Gas Poisoning ...	...	...	...	...	...	...	...	...
168. Suicide by Hanging or Strangulation	...	...	...	...	...	...	...	...
169. Suicide by Drowning	...	...	...	...	...	..	...	...
170. Suicide by Firearms	...	...	...	...	...	...	...	...
171. Suicide by cutting or stabbing instruments	...	...	...	...	...	...	...	...
172. Suicide by jumping from a height	...	...	...	...	...	...	...	...
173. Suicide by crushing	...	...	...	...	...	...	...	...
174. Other Suicides	...	...	...	...	...	...	...	...
175. Food Poisoning	...	4	...	4	...	22	10	...
Botulism	...	1	...	1	...	1	...	...
176. Attacks of poisonous animals								
Snake Bite	...	...	...	...	...	5	1	...
Insect Bite	...	1	...	1	...	28	13	...
177. Other accidental Poisonings	...	...	...	...	...	...	...	...
178. Burns (by Fire)	1	3	...	4	...	16	7	...
179. Burns (other than by Fire) ...	...	1	...	1	...	14	2	...
180. Suffocation (accidental) ...	...	...	...	...	...	...	...	...
181. Poisoning by Gas (accidental)	...	...	...	...	...	...	...	...
182. Drowning (accidental)	...	...	...	...	...	...	...	...
183. Wounds (by Firearms, war excepted)	...	...	...	...	...	1	...	...
184. Wounds (by cutting or stabbing instruments)...	...	8	...	8	...	33	4	...
185. Wounds (by Fall)	...	27	1	27	...	244	9	...
186. Wounds (in Mines or Quarries)	...	...	...	...	...	2	...	...
187. Wounds (by Machinery) ...	...	...	...	...	...	5	...	...
188. Wounds (crushing, *e.g.* railway accidents, &c.)	...	...	...	...	...	6	1	...
Carried forward	28	1,306	22	1,334	35	6,512	702	2

TABLE IV.—RETURN OF DISEASES AND DEATHS (EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	28	1,306	22	1,334	35	6,512	702	2
XIV.—*Affections produced by External Causes*—contd.								
189. Injuries inflicted by Animals, Bites, Kicks, &c.	...	1	...	1	...	25	2	...
190. Wounds inflicted on Active Service	...	...	...	...	...	...	...	...
191. Executions of civilians by belligerents	...	...	...	...	...	...	...	...
192. A.—Over fatigue	...	1	...	1	...	3	...	...
B.—Hunger or Thirst ...	...	1	...	1	1	...	...	...
193. Exposure to Cold, Frost bite, &c.	...	...	...	...	...	...	...	...
194. Exposure to Heat—								
Heatstroke	...	3	1	3	...	15	4	..
Sunstroke	...	...	...	...	...	13	1	1
195. Lightning Stroke	...	1	...	1	...	...	...	...
196. Electric Shock	...	...	...	...	...	...	...	...
197. Murder by Firearms	...	...	...	...	...	...	...	...
198. Murder by cutting or stabbing instruments	...	...	...	...	...	...	...	...
199. Murder by other means ...	...	...	...	...	...	...	...	...
200. Infanticide (Murder of an infant under one year) ...	...	...	...	...	...	...	...	...
201. A.—Dislocation	...	4	...	4	...	4	...	...
B.—Sprain	1	6	...	7	...	125	4	...
C.—Fracture	2	21	1	23	...	38	2	...
202. Other External Injuries ...	1	14	...	15	2	205	15	...
203. Deaths by Violence of unknown cause	...	...	...	...	...	...	...	...
XV.—*Ill-Defined Diseases.*								
204. Sudden Death (cause unknown)	...	1	1	1	...	...	...	...
205. A.—Diseases not already specified or ill-defined—								
Ascites	...	1	...	1	...	6	...	...
Œdema	...	...	...	...	...	3	3	...
Asthenia	1	10	...	11	...	111	15	...
Shock	...	...	...	...	...	...	...	...
Hyperpyrexia	...	...	...	...	...	4	2	...
B.—Malingering	...	1	...	1	...	...	...	...
P. W. O.	...	3	...	3	1	...	...	...
XVI.—*Diseases, the total of which have not caused 10 Deaths*—								
Ulcers	...	4	...	4	...	84	7	...
Contusion	...	1	...	1	...	4	...	...
Vaccination	...	...	...	...	...	5	...	...
Phimosis	...	...	...	...	...	1	...	...
Podiculi Pubes	...	...	...	...	...	2	...	...
Total	33	1,379	25	1,412	39	7,160	757	3

One Official committed suicide at Apapa from Gas poisoning and one died on Board R.M.S. *Appam* from Alcoholism; total deaths = 30; Official 13, Unofficial 17.

TABLE V.

RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930.

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL. Admissions.	TOTAL. Deaths.	Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
I.—*Epidemic, Endemic, and Infectious Diseases.*								
1. Enteric Group—								
(*a*) Typhoid Fever	1	6	1	7	...	...	...	...
(*b*) Paratyphoid A.	...	...	...	...	...	...	...	...
(*c*) Paratyphoid B.	...	4	...	4	...	...	...	...
(*d*) Type not defined	1	13	5	14	2	...	...	...
2. Typhus	...	...	...	...	...	...	...	...
3. Relapsing Fever	1	106	10	107	14	143	47	...
4. Undulant Fever	...	...	...	...	...	...	...	...
5. Malaria—								
(*a*) Tertian	...	36	1	36	2	234	143	...
(*b*) Quartan	...	41	...	41	...	3	8	...
(*c*) Aestivo-autumnal	14	1,848	40	1,862	27	20,372	6,731	5
(*d*) Cachexia	...	4	1	4	...	30	6	...
(*e*) Blackwater	...	4	2	4	...	1	1	...
6. Smallpox	43	675	173	718	5	211	162	...
Alastrim	5	136	19	141	...	92	28	5
7. Measles	...	45	...	45	2	126	74	...
8. Scarlet Fever	...	...	...	...	...	3	...	...
9. Whooping Cough	...	5	...	5	...	146	107	2
10. Diphtheria	...	...	...	...	...	...	...	...
11. Influenza	5	168	3	173	6	604	141	1
12. Miliary Fever	...	...	...	...	...	2	...	...
13. Mumps	5	46	...	51	...	230	51	...
14. Cholera	...	...	...	...	...	...	...	...
15. Epidemic diarrhoea	...	1	...	1	...	7	8	...
16. Dysentery—								
(*a*) Amœbic	14	769	79	783	4	1,502	608	...
(*b*) Bacillary	2	164	29	166	2	102	17	...
(*c*) Undefined or due to other causes	2	353	35	355	6	730	191	1
17. Plague—								
(*a*) Bubonic	2	6	6	8	...	...	...	...
(*b*) Pneumonic	...	2	2	2	...	...	...	...
(*c*) Septicæmic	...	1	1	1	...	...	1	...
(*d*) Undefined	...	...	...	...	...	...	...	...
18. Yellow Fever	...	...	...	...	...	...	...	...
19. Spirochætosis ictero-hæmorrhagica	...	...	...	...	...	30	3	...
20. Leprosy	547	758	55	1,305	539	2,016	833	...
21. Erysipelas	...	4	...	4	...	5	1	...
22. Acute Poliomyelitis	...	2	1	2	...	5	1	...
23. Encephalitis Lethargica	...	...	...	...	...	1	1	...
24. Epidemic Cerebro-spinal Fever ...	2	28	25	30	...	32	11	29
25. Other Epidemic Diseases—								
(*a*) Rubeola (German Measles)	...	...	...	...	...	8	8	...
(*b*) Varicella (Chicken-pox) ...	5	900	7	905	12	986	65	...
(*c*) Kala-azar	...	...	...	...	...	...	...	...
(*d*) Phlebotomus Fever ...	...	...	...	...	...	...	...	...
(*e*) Dengue	...	8	...	8	...	16	2	...
(*f*) Epidemic Dropsy	...	...	...	...	...	...	...	...
(*g*) Yaws	8	812	6	820	7	23,092	16,031	...
(*h*) Trypanosomiasis*	182	886	69	1,068	74	915	364	...
(*i*) Filariasis	...	2	...	2	...	29	10	...
Carried forward	839	7,833	570	8,672	702	51,673	25,654	43

* Figures do not include 2,891 cases treated by Travelling Sleeping Sickness Officers.

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1928.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1929.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	839	7,833	570	8,672	702	51,673	25,654	43
I.—*Epidemic, Endemic, and Infectious Diseases*—contd.								
26. Glanders	...	...	...	...	...	...	...	...
27. Anthrax	...	...	...	...	...	...	...	...
28. Rabies	...	...	...	...	...	1	...	...
29. Tetanus	...	50	21	50	3	4	9	1
30. Mycosis	1	19	...	20	3	14	11	...
31. Tuberculosis, Pulmonary and Laryngeal	18	333	120	351	16	270	83	1
32. Tuberculosis of the Meninges or Central Nervous System	...	9	3	9	...	2	3	...
33. Tuberculosis of the Intestines or Peritoneum	...	16	7	16	1	7	6	...
34. Tuberculosis of the Vertebral Column	...	22	3	22	2	13	12	...
35. Tuberculosis of Bones and Joints	6	58	2	64	7	38	22	...
36. Tuberculosis of other organs—								
(*a*) Skin or Subcutaneous Tissue (Lupus)	1	10	3	11	1	9	7	...
(*b*) Bones	...	7	...	7	3	6	3	...
(*c*) Lymphatic System ...	...	26	2	26	3	32	12	...
(*d*) Genito-urinary	...	...	...	...	...	1	1	...
(*e*) Other Organs	...	18	3	18	...	7	4	...
37. Tuberculosis disseminated—								
(*a*) Acute	...	8	4	8	...	15	4	...
(*b*) Chronic	...	2	1	2	...	8	1	...
38. Syphilis—								
(*a*) Primary	19	411	1	430	19	2,553	1,012	...
(*b*) Secondary	27	736	8	763	27	1,853	800	...
(*c*) Tertiary	28	309	13	337	18	2,843	1,894	...
(*d*) Hereditary	10	21	1	31	2	57	35	3
(*e*) Period not indicated ...	11	132	16	143	9	758	189	...
39. Soft Chancre	10	98	...	108	6	350	18	...
40. A.—Gonorrhœa and its complications	23	890	16	913	45	10,406	885	...
B.—Gonorrhoeal Ophthalmia ...	7	65	...	72	1	141	38	...
C.—Gonorrhoeal Arthritis ...	10	117	1	127	1	328	30	...
D.—Granuloma Venereum ...	1	37	1	38	2	26	18	...
41. Septicæmia	1	44	22	45	2	12	4	...
42. Other Infectious Diseases—Trypanosomiasis	...	...	...	...	...	309	87	...
II.—*General Diseases not mentioned above.*								
43. Cancer or other malignant Tumours of the Buccal Cavity ...	2	3	...	5	...	4	2	...
44. Cancer or other malignant Tumours of the Stomach or Liver	...	16	9	16	...	3	1	...
45. Cancer or other malignant Tumours of the Peritoneum intestines, Rectum	...	13	5	13	...	1	...	...
46. Cancer or other malignant Tumours of the Female Genital Organs	2	15	4	17	1	...	10	...
47. Cancer or other malignant Tumours of the Breast	...	9	...	9	1	...	...	...
48. Cancer or other malignant Tumours of the Skin	1	30	1	31	1	13	2	...
Carried forward	1,017	11,357	837	12,374	876	71,757	30,857	48

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,017	11,357	837	12,374	876	71,757	30,857	48
II.—*General Diseases not mentioned above*—contd.								
49. Cancer or other malignant Tumours of Organs not specified	3	38	8	41	1	22	9	...
50. Tumours non-Malignant	12	454	11	466	11	1,260	485	...
51. Acute Rheumatism	1	195	2	196	3	2,962	1,131	...
52. Chronic Rheumatism	12	440	7	452	18	13,513	4,454	...
53. Scurvy (including Barlow's Disease)	...	1	...	1	...	4	1	...
54. Pellagra	...	...	...	...	...	...	...	...
55. Beri-Beri	...	6	4	6	...	2	2	...
56. Rickets	...	5	1	5	...	13	7	...
57. Diabetes (not including Insipidus)	2	16	4	18	1	24	11	...
58. Anæmia :—								
(*a*) Pernicious	...	20	4	20	2	47	26	...
(*b*) Other Anæmias and Chlorosis	4	97	7	101	4	1,072	397	...
59. Diseases of the Pituitary Body ...	...	...	...	...	...	2	...	...
60. Diseases of the Thyroid Gland ...	...	...	...	...	...	46	39	...
(*a*) Exophthalmic Goitre ...	...	15	1	15	...	30	61	...
(*b*) Other diseases of the Thyroid Gland, Myxœdema ...	...	20	3	20	...	65	67	...
61. Diseases of the Para-Thyroid Glands	...	1	...	1	...	1	1	...
62. Diseases of the Thymus	...	...	...	..	...	...	...	...
63. Diseases of the Supra-Renal Glands	...	...	...	...	...	2	5	...
64. Diseases of the Spleen	2	67	4	69	8	903	581	...
65. Leukæmia :—								
(*a*) Leukæmia	...	6	2	6	...	4	...	...
(*b*) Hodgkin's Disease	...	7	1	7	...	2	...	...
66. Alcoholism	...	3	...	3	...	3	1	...
67. Chronic poisoning by mineral substances (lead, mercury, &c.) ...	...	...	...	...	...	...	...	...
68. Chronic poisoning by organic substances (Morphia, Cocaine, &c.)	...	...	...	...	...	...	...	...
69. Other General Diseases :—								
Auto-intoxication	...	2	...	2	...	14	2	...
Purpura Hæmorrhagica ...	...	1	...	1	...	...	...	...
Hæmophilia	...	...	...	...	...	1	...	...
Diabetes Insipidus	...	2	1	2	...	1	...	...
III.—*Affections of the Nervous System and Organs of the Senses.*								
70. Encephalitis (not including Encephalitis Lethargica)	...	6	1	6	...	4	...	...
71. Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Meningitis)	...	29	17	29	...	6	2	...
72. Locomotor Ataxia	1	6	...	7	2	12	3	...
73. Other affections of the Spinal Cord	3	19	6	22	1	19	8	...
Carried forward	1,057	12,813	921	13,870	927	91,791	38,150	48

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total Cases treated.	Remaining in Hospital at end of 1930	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,057	12,813	921	13,870	927	91,791	38,150	48
III.—*Affections of the Nervous System and Organs of the Senses*—contd.								
74. Apoplexy:—								
(*a*) Hæmorrhage	2	13	5	15	...	3	1	...
(*b*) Embolism	...	1	...	1	...	1	...	...
(*c*) Thrombosis	...	3	1	3	...	1	...	...
75. Paralysis:—								
(*a*) Hemiplegia	3	52	8	55	3	58	15	...
(*b*) Other Paralyses	9	126	12	135	12	145	49	...
76. General Paralysis of the Insane	...	7	1	7	...	...	...	...
77. Other forms of mental Alienation	144	92	25	236	124	66	25	...
78. Epilepsy	2	115	8	117	3	290	116	...
79. Eclampsia, Convulsions (nonpuerperal) 5 years or over	...	1	...	1	...	4	1	...
80. Infantile Convulsions	1	12	3	13	...	18	18	4
81. Chorea	...	1	...	1	...	4	5	...
82. A.—Hysteria	...	27	...	27	...	90	24	...
B.—Neuritis	2	45	...	47	1	1,177	277	...
C.—Neurasthenia	1	32	...	33	3	188	64	...
83. Cerebral Softening	...	3	1	3	1	51	10	...
84. Other affections of the Nervous System, such as Paralysis Agitans	1	31	1	32	1	484	96	...
85. Affections of the Organs of Vision:—								
(*a*) Diseases of the eye	6	128	...	134	11	1,510	359	...
(*b*) Conjunctivitis	6	222	...	228	8	5,405	1,932	...
(*c*) Trachoma	2	23	...	25	...	85	47	...
(*d*) Tumours of the Eye	...	12	...	12	1	27	15	...
(*e*) Other affections of the Eye	9	148	...	157	5	1,450	374	...
86. Affections of the Ear or Mastoid Sinus	1	69	...	70	1	4,978	1,951	...
IV.—*Affections of the Circulatory System.*								
87. Pericarditis	1	15	5	16	1	28	2	...
88. Acute Endocarditis or Myocarditis	...	52	11	52	3	90	38	...
89. Angina Pectoris	...	4	...	4	2	2	1	...
90. Other Diseases of the Heart:—								
(*a*) Valvular:—	...	6	2	6	...	36	4	2
Mitral	...	108	29	108	2	388	142	2
Aortic	...	28	10	28	...	120	28	...
Tricuspid	...	1	...	1	...	1	...	...
Pulmonary	...	1	1	1	...	2	1	...
(*b*) Myocarditis	...	46	19	46	2	109	24	...
Others	...	8	5	8	1	14	6	...
91. Diseases of the Arteries:—								
(*a*) Aneurism	...	20	6	20	...	32	4	...
(*b*) Arterio-Sclerosis	1	5	3	6	...	20	2	1
(*c*) Other diseases	...	1	...	1	...	5	1	...
92. Embolism or Thrombosis (non-cerebral)	...	4	1	4	...	...	2	...
Carried forward	1,248	14,275	1,078	15,523	1,112	108,673	43,784	57

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,248	14,275	1,078	15,523	1,112	108,673	43,784	57
IV.—*Affections of the Circulatory System*—contd.								
93. Diseases of the Veins:--								
Hæmorrhoids	6	98	...	104	2	510	107	...
Varicose Veins	...	1	...	1	...	42	2	...
Phlebitis	...	11	1	11	1	6	2	...
Others	...	1	...	1	...	...	...	...
94. Diseases of the Lymphatic System—								
Lymphangitis	2	47	2	49	1	217	44	...
Lymphadenitis, Bubo (non-specific)	14	487	2	501	21	1,721	307	...
95. Hæmorrhage of undetermined cause	...	4	2	4	...	14	5	...
96. Other affections of the Circulatory System	...	11	3	11	1	67	15	...
V.—*Affections of the Respiratory System.*								
97. Diseases of the Nasal Passages—								
Adenoids	...	5	...	5	...	26	15	...
Polypus	...	9	...	9	...	20	6	...
Rhinitis	...	6	...	6	...	172	85	...
Coryza	2	28	...	30	...	1,731	839	...
Others	...	2	...	2	...	6	2	...
98. Affections of the Larynx—								
Laryngitis	1	16	1	17	...	404	193	...
99. Bronchitis—								
(*a*) Acute	17	706	29	723	10	13,596	4,747	15
(*b*) Chronic	12	318	16	330	8	6,400	2,511	2
100. Broncho-Pneumonia	5	208	53	213	10	166	75	6
101. Pneumonia—								
(*a*) Lobar	44	971	208	1,015	24	263	47	1
(*b*) Unclassified	3	147	40	150	5	126	21	2
102. Pleurisy, Empyema	3	179	11	182	2	366	65	...
103. Congestion of the Lungs	...	7	2	7	...	9	2	..
104. Gangrene of the Lungs	...	2	1	2	...	...	...	..
105. Asthma	2	74	3	76	4	142	34	...
106. Pulmonary Emphysema	...	2	...	2	...	13	6	...
107. Other affections of the Lungs—								
Pulmonary Spirochætosis ...	...	6	1	6	...	42	2	...
Others	1	...	...	1	...	7	...	...
VI.—*Diseases of the Digestive System.*								
108. A.—Diseases of Teeth or Gums—								
Caries, Pyorrhœa, &c.	1	60	1	61	...	3,874	1,579	...
B.—Other affections of the Mouth—								
Stomatitis	...	45	2	45	...	1,201	565	...
Glossitis, &c.	...	17	1	17	1	803	167	...
Others	...	...	...	...	...	...	...	...
109. Affections of the Pharynx or Tonsils—								
Tonsillitis	2	62	1	64	1	862	329	...
Pharyngitis	2	11	1	13	1	493	122	...
Carried forward	1,365	17,816	1,459	19,181	1,204	141,972	55,678	83

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward ...	1,365	17,816	1,459	19,181	1,204	141,972	55,678	83
VI.—*Diseases of the Digestive System*—contd.								
110. Affections of the Œsophagus ...	...	2	...	2	...	2	...	...
111. A.—Ulcer of the Stomach ...	..	9	1	9	...	11	3	...
B.—Ulcer of the Duodenum ...	...	1	...	1	...	5	...	...
112. Other affections of the Stomach—								
Gastritis	1	121	5	122	1	1,621	806	...
Dyspepsia, &c.	4	68	3	72	2	3,089	1,178	...
113. Diarrhœa and Enteritis Under two years	1	167	9	168	...	1,203	649	2
114. Diarrhœa and Enteritis—								
Two years and over	5	547	38	552	11	3,547	1,154	1
Colitis	4	60	2	64	4	461	175	...
Ulceration	...	3	2	3	...	1	...	...
114a. Sprue	...	...	...	...	...	...	...	...
115. Ankylostomiasis	3	182	12	185	10	1,104	541	...
116. Diseases due to Intestinal Parasites—								
(*a*) Cestoda (Tænia)	...	51	...	54	1	6,258	1,234	...
(*b*) Trematoda (Flukes) ...	...	3	...	3	1	35	5	...
(*c*) Nematoda (other than Ankylostoma)	...	4	...	4	...	348	64	...
Ascaris	1	76	2	77	3	11,093	9,149	...
Trichocephalus dispar ...	...	...	...	...	...	141	24	...
Trichina	...	...	...	...	...	...	...	...
Dracunculus	15	450	2	465	11	1,821	266	...
Strongylus	...	1	...	1	...	23	1	...
Oxyuris	...	1	...	1	...	66	30	...
(*d*) Coccidia	...	...	...	...	...	...	...	...
(*e*) Other parasites	3	15	...	18	...	64	282	...
(*f*) Unclassified	1	17	...	18	...	983	227	...
117. Appendicitis	...	41	11	41	2	25	11	...
118. Hernia	88	1,851	90	1,939	69	1,555	104	1
119. A.—Affections of the Anus, Fistula, &c.	11	122	6	133	10	127	47	...
B.—Other affections of the Intestines—								
Enteroptosis	...	5	...	5	...	240	22	...
Constipation	1	112	...	113	...	19,625	5,773	...
Others	...	4	1	4	...	...	...	...
120. Acute Yellow Atrophy of the Liver	...	...	...	...	...	...	...	...
121. Hydatid of the Liver	...	...	...	...	...	...	...	...
122. Cirrhosis of the Liver—								
(*a*) Alcoholic	...	...	...	...	...	...	...	...
(*b*) Other forms	1	34	13	35	2	15	6	...
123. Biliary Calculus	...	2	...	2	...	1	...	...
124. Other affections of the Liver—								
Abscess	...	54	8	54	3	18	1	...
Hepatitis	2	75	8	77	3	130	19	...
Cholecystitis	...	7	2	7	...	15	...	...
Jaundice	1	107	20	108	2	182	38	...
Others	...	1	...	1	...	...	...	...
Carried forward	1,507	22,012	1,694	23,519	1,339	195,781	77,487	87

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,507	22,012	1,694	23,519	1,339	195,781	77,487	87
VI.—*Diseases of the Digestive System* –(contd.)								
125. Diseases of the Pancreas... ...	...	2	...	2	...	4	...	...
126. Peritonitis (of unknown cause) ...	2	46	17	48	1	10	7	...
127. Other affections of the Digestive System	...	55	6	55	...	270	114	...
VII.—*Diseases of the Genito-urinary System (non-Venereal)*								
128. Acute Nephritis	9	65	26	74	1	83	34	...
129. Chronic	2	88	28	90	4	53	22	...
130. A. - Chyluria	...	4	...	4	...	1	...	...
B.—Schistosomiasis	4	79	9	83	2	279	15	...
131. Other affections of the Kidneys—Pyelitis, &c.	1	18	3	19	...	22	7	...
132. Urinary Calculus	...	8	1	8	...	8	2	...
133. Diseases of the Bladder –								
Cystitis	1	107	5	108	4	540	231	1
Others	...	3	2	3	...	2	...	...
134. Diseases of the Urethra—								
(*a*) Stricture	29	276	18	305	11	431	1	...
(*b*) Other...	2	65.	4	67	2	266	16	...
135. Diseases of the Prostate—								
Hypertrophy	..	...	...	...	...	1	...	...
Prostatitis	1	11	1	12	...	26	...	...
136. Diseases (non-Venereal) of the Genital Organs of Man—								
Epididymitis	2	50	...	52	...	155	...	...
Orchitis	1	134	...	135	3	469	...	...
Hydrocele	14	378	10	392	34	732	...	...
Ulcer of Penis	1	89	..	90	3	412	...	...
Others	1	426	1	427	14	386	...	...
137. Cysts or other non-malignant Tumours of the Ovaries	...	37	5	37	4	...	60	...
138. Salpingitis	...	...	...	...	...	...	75	...
Abscess of the Pelvis	...	16	5	16	...	...	24	...
Others	...	55	2	55	2	...	38	...
139. Uterine Tumours (non-malignant)	...	40	2	40	1	...	36	...
140. Uterine Hæmorrhage (non-puerperal)	...	16	...	16	...	...	56	...
141. A.—Metritis	...	67	3	67	2	...	124	...
B.—Other affections of the Female Genital Organs—	...	...	...	...	...	...	...	...
Displacements of Uterus ...	6	48	1	54	4	...	97	...
Amenorrhoea	...	6	...	6	...	...	193	...
Dysmenorrhœa	5	98	1	103	2	...	861	...
Leucorrhœa	...	22	...	22	1	...	200	...
Others	1	84	1	85	1	...	304	...
142. Diseases of the Breast (non-puerperal) –								
Mastitis	...	39	1	39	1	3	272	...
Abscess of Breast	1	22	...	23	..	2	54	...
Carried forward	1,590	24,466	1,846	26,056	1,436	199,936	80,330	88

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,590	24,466	1,846	26,056	1,436	199,936	80,330	88
VIII.—*Puerperal State.*								
143. A.—Normal Labour	3	297	7	300	6	...	73	...
B.—Accidents of Pregnancy—	...	...	...	...	...	...	...	...
(*a*) Abortion	3	91	5	94	2	...	142	...
(*b*) Ectopic Gestation	...	8	2	8	...	...	2	...
(*c*) Other accidents of Pregnancy...	1	105	14	106	...	...	184	...
144. Puerperal Hæmorrhage	...	1	...	1	...	...	4	...
145. Other accidents of Parturition ...	5	72	17	77	2	...	14	...
146. Puerperal Septicæmia	1	10	6	11	...	...	3	...
147. Phlegmasia Dolens...	...	1	1	1	...	...	1	...
148. Puerperal Eclampsia	...	3	3	3	...	...	...	...
149. Sequelæ of Labour	.	32	1	32	3	...	67	...
150. Puerperal affections of the Breast	...	5	...	5	...	...	27	1
IX.—*Affections of the Skin and Cellular Tissues.*								
151. Gangrene	3	42	8	45	3	75	23	...
152. Boil	...	111	...	111	1	1,958	406	...
Carbuncle	1	44	3	45	2	1,313	321	...
153. Abscess	31	913	20	944	48	3,261	525	...
Deep Muscle	...	52	...	52	...	4	...	...
Whitlow	6	156	...	162	9	2,267	393	...
Cellulitis	27	714	17	741	29	2,281	476	1
154. A.—Tinea	2	39	...	41	5	4,295	661	...
B.—Scabies	1	62	1	63	2	3,167	658	...
155. Other Diseases of the Skin—								
Erythema...	...	2	...	2	...	237	48	...
Urticaria	...	17	...	17	...	558	127	...
Eczema	1	46	...	47	1	1,491	454	...
Herpes	...	10	...	10	...	114	32	...
Psoriasis	...	2	...	2	...	69	31	...
Elephantiasis	17	365	14	382	25	325	55	...
Myiasis	2	11	...	13	1	36	5	...
Chigoes	...	32	...	32	1	288	128	...
Cutaneous Leishmaniasis ..	...	5	...	5	...	1	1	...
Others	21	249	3	270	26	4,400	1,534	...
X.—*Diseases of bones and Organs of Locomotion (other than Tuberculous).*								
156. Diseases of Bones—								
Osteitis	23	161	4	184	19	538	186	...
157. Diseases of Joints—								
Arthritis	13	281	6	291	16	1,097	404	...
Synovitis	5	154	1	159	7	485	237	...
158. Other Diseases of Bones or Organs of Locomotion	3	136	3	139	10	1,215	292	...
Carried forward	1,759	28,695	1,982	30,454	1,654	229,411	87,844	90

Table V.—Return of Diseases and Deaths (Non-European) for the year 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	Total.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,759	28,695	1,982	30,454	1,654	229,411	87,844	90
XI.—*Malformations.*								
159. Malformations—	1	5	...	6	...	9	3	...
Hydrocephalus	...	2	2	2	...	11	3	...
Hypospadias	...	1	...	1	...	...	...	...
Spina Bifida, etc.	...	11	2	11	...	9	4	...
Others	...	...	...	...	...	2	...	...
XII.—*Diseases of Infancy.*								
160. Congenital Debility	2	47	10	49	1	68	35	...
161. Premature Birth	...	16	7	16	1	5	9	2
162. Other affections of infancy ...	4	88	30	92	5	97	181	...
163. Infant neglect (infants of three months or over)	...	21	5	21	3	1	2	...
XIII.—*Affections of Old Age.*								
164. Senility—	...	20	9	20	...	47	28	1
Senile Dementia	1	7	5	8	...	8	...	...
XIV.—*Affections produced by External Causes.*								
165. Suicide by Poisoning	...	...	...	...	...	..	...	...
166. Corrosive Poisoning (Intentional)	...	...	...	...	...	...	...	...
167. Suicide by Gas Poisoning	...	...	...	...	...	...	...	...
168. Suicide by Hanging or Strangulation	...	...	...	...	...	2	...	1
169. Suicide by Drowning	...	...	...	...	..	...	..	...
170. Suicide by Firearms	...	2	...	2	...	...	...	...
171. Suicide by cutting or stabbing Instruments	...	7	...	7	...	3	...	...
172. Suicide by jumping from a height	...	...	...	...	...	...	...	...
173. Suicide by crushing	...	...	...	...	...	...	...	...
174. Other Suicides	...	...	...	...	...	...	...	...
175. Food Poisoning—	...	7	3	7	...	8	...	...
Botulism	...	...	...	...	...	7	1	...
176. Attacks of poisonous animals ...	...	...	...	...	...	...	...	...
Snake Bite	2	61	3	63	2	104	16	...
Insect Bite	1	5	...	6	...	228	55	...
Others	...	1	...	1	...	4	...	...
177. Other accidental Poisonings ...	...	30	4	30	1	10	4	...
178. Burns (by Fire)	9	176	28	185	12	810	290	...
179. Burns (other than by Fire) . .	2	53	7	55	3	382	141	...
180. Suffocation (accidental)	...	...	...	...	...	3	...	...
181. Poisoning by Gas (accidental) ...	...	...	...	...	...	...	...	...
182. Drowning (accidental)	...	...	...	...	...	...	...	..
183. Wounds (by Firearms, war excepted)	26	54	7	80	3	19	3	...
184. Wounds (by cutting or stabbing instruments)	42	232	2	274	11	3,143	639	...
185. Wounds (by Fall)	12	703	28	715	48	3,870	370	...
186. Wounds (in Mines or Quarries) ...	6	224	7	230	5	569	167	...
187. Wounds (by Machinery)	1	47	3	48	2	2,813	21	...
Carried forward	1,868	30,515	2,144	32,383	1,751	241,643	89,816	94

TABLE V.—RETURN OF DISEASES AND DEATHS (NON-EUROPEAN) FOR THE YEAR 1930—*continued.*

Diseases.	IN-PATIENTS.					OUT-PATIENTS.		
	Remaining in Hospital at end of 1929.	TOTAL.		Total cases treated.	Remaining in Hospital at end of 1930.	Male.	Female.	Deaths.
		Admissions.	Deaths.					
Brought forward	1,868	30,515	2,144	32,383	1,751	241,643	89,816	94
XIV.—*Affections produced by External Causes—contd.*								
188. Wounds (crushing, *e.g.* railway accidents, etc.)	3	39	3	42	...	404	29	...
189. Injuries inflicted by Animals, Bites, Kicks, etc.	1	90	...	91	2	1,048	177	...
190. Wounds inflicted on Active Service	...	21	1	21	3	277	88	...
191. Executions of civilians by belligerents	...	3	...	3	...	...	...	...
192. A.—Over fatigue	...	3	3	3	...	...	...	...
B.—Hunger or Thirst	...	12	6	12	...	3	...	...
193. Exposure to Cold, Frost bite, etc.	...	7	3	7	...	19	1	...
194. Exposure to Heat—								
Heatstroke	...	1	...	1	...	...	1	...
Sunstroke	...	3	...	3	...	2	...	...
195. Lightning Stroke	...	1	1	1	...	2	...	...
196. Electric Shock	...	2	1	2	...	1	1	...
197. Murder by Firearms	...	1	...	1	...	...	...	...
198. Murder by cutting or stabbing instruments	...	2	...	2	1	2	...	...
199. Murder by other means	...	1	...	1	...	...	...	...
200. Infanticide (Murder of an infant under one year)	...	...	...	...	...	1	...	1
201. A.—Dislocation	1	41	2	42	1	47	16	...
B.—Sprain	17	88	1	105	...	1,728	163	...
C.—Fracture	38	307	17	345	27	309	61	...
202. Other External Injuries	25	1,087	15	1,112	36	18,873	2,630	...
203. Deaths by Violence of unknown cause	...	1	1	1	...	...	...	...
XV.—*Ill-Defined Diseases.*								
204. Sudden Death (cause unknown)	...	1	1	1	...	...	...	...
205. A.—Diseases not already specified or ill-defined—								
Ascites	4	117	27	121	8	108	22	1
Œdema	3	58	5	61	3	145	54	...
Asthenia	...	76	13	76	7	431	161	1
Shock	...	13	2	13	...	24	1	...
Hyperpyrexia	...	10	1	10	...	261	83	...
Others	...	...	...	...	...	41	5	...
Vertigœ	...	1	...	1	...	...	...	...
B.—Malingering	...	27	...	27	...	61	1	...
XVI.—*Diseases, the total of which have not caused 10 Deaths* ...	...	3	1	3	...	...	9	...
Tropical Ulcers	204	2,811	50	3,015	232	30,061	9,480	...
Airhum	1	...	...	1	...	...	2	...
Phimosis	...	2	...	2	...	124	...	...
Pregnancy	...	8	...	8	...	...	628	...
Vaccination	...	...	...	...	...	8	...	...
Child Welfare	...	...	...	...	...	85	123	...
Total	2,165	35,352	2,298	37,517	2,071	295,708 103 552	103,552	97

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APPENDICES.

APPENDIX A.

REPORT OF THE LABORATORY SERVICE, 1930.

BY

ANDREW CONNAL, M.D., D.P.H., D.T.M. AND H.
Deputy Director, Laboratory Service.

MEDICAL LABORATORY SERVICE—ANNUAL REPORT, 1930.

The first Annual Report of the Laboratory Service includes the twenty-second Annual Report of the Medical Research Institute.

The amalgamation of the Medical Research Institute with the Clinical Laboratories, the Dietetic Research Station and the Research laboratory as one branch of the Medical Department, namely the Laboratory Service, came into force on 1st April, 1930, and it has worked harmoniously and well although further developments are necessary.

The subjects dealt with in the report are all treated shortly.

The signs of rat plague and the species and prevalence of rat-fleas are described.

Intestinal Coccidiosis and Muscle abscess have been investigated.

The usual yearly synopsis of Blackwater Fever cases is given.

Dr. S. L. M. Connal reports on Entomology and adds notes on some experiments in the transmission of *Wuchereria bancrofti.*

Under the heading of Dermatology, Dr. E. C. Smith gives certain findings with yaws and with tropical ulcer.

Dr. J. A. Young continues his report on intestinal complaints in Lagos.

Dr. R. M. Burnie, on special research, describes his work on relapsing fever.

Dr. W. McCulloch, on dietetic research reports on pica and trypanosomiasis in cattle, prison diets and standard dietaries for laboratory animals.

Dr. B. G. T. Elmes gives histological findings generally and adds a note on rabies.

The reports from the Clinical Laboratories, by Dr. H. Morrison, Dr. G. W. St. C. Ramsay, Dr. W. McCoach and Dr. F. Williams, have been abstracted and grouped together for reference and comparison. It should be added that, in addition to their laboratory work, these Pathologists give lectures and demonstrations regularly to the African laboratory staff.

A description of experimental work with Neuro-vaccine by Dr. E. C. Smith and Dr. B. G. T. Elmes concludes the report.

A. CONNAL,
Deputy Director, Laboratory Service.

RAT PLAGUE.

As compared with the years 1928 and 1929 there was a considerable drop in the number of rats obtained during 1930 in Lagos. The total number obtained and examined was 52,122 of which 250 were found to be plague-infected. The infection-rate, therefore, has dropped very considerably, being the lowest recorded since the beginning of the outbreak in 1924. The figures are to be seen in Table I.

TABLE I.

Rat Examinations in Lagos.

Year.	Rats examined.	Rats infected.	Infection-rate.
1924 (six months) ...	6,348	147	1 in 43
1925	36,370	273	1 in 133
1926	42,830	1,020	1 in 42
1927	57,049	676	1 in 84
1928	75,639	1,214	1 in 62
1929	75,853	430	1 in 176
1930	52,122	250	1 in 208
Six and a half years ...	346,211	4,010	1 in 86

There were 51,501 rats brought in dead and 621 caught alive. Of these, 49,476 were *Rattus rattus*, 2,265 *Rattus norvegicus* and 381 *Dasymys rufulus*. Included in the total of *R. rattus* were 1,128 *R. r. frugivorus* and 281 *R. r. alexandrinus*.

In addition, 1,839 shrews (*Crocidura manni*) were caught.

Many thousands of mice were trapped but they were not examined.

No examples of the " striped " rat *Lemniscomys fasciatus* or of the " pouched " rat *Cricetomys gambianus* were trapped.

Plague infection was found only in the " black " rat (*R. rattus*) and the " brown " rat (*R. norvegicus*), there being 244 positive cases in the former and six in the latter. The monthly percentages of infection are given in Table II.

Paid rat-catchers brought in 166 positive rats, the de-ratting gangs provided forty-nine, and thirty-five came from the Port Health Officer.

All the infected rats were of adult size, with the exception of eight which measured four inches or less from tip of snout to root of tail.

TABLE II.

MONTHLY PERCENTAGE OF RAT PLAGUE INFECTION.

Month.	Total rattus.	Per cent. Infected.	Total norvegicus.	Per cent. Infected.	Total rufulus.	Per cent. Infected.	Total rodents.	Percentage Infected.
January	5,257	0·76	281	...	81	...	5,619	0·71
February	4,261	0·98	190	...	90	...	4,541	0·92
March	5,192	0·65	224	1·78	35	...	5,451	0·69
April	5,738	0·12	271	...	11	...	6,020	0·11
May	5,936	0·28	266	...	7	...	6,209	0·27
June	3,499	0·31	178	...	3	...	3,680	0·29
July	4,127	0·48	143	...	19	...	4,289	0·46
August	3,141	0·50	83	...	17	...	3,241	0·49
September ...	3.138	0·60	91	...	50	...	3,279	0·57
October	3,134	0·70	206	...	25	...	3,365	0·65
November ...	3,066	0·29	186	1·07	35	...	3,287	0·33
December	2,987	0·23	146	...	8	...	3,141	0·22
1930	49,476	0·49	2,265	0·26	381	...	52,122	0·47

The weeks with the highest percentage of positive rats (*i.e.*, 1.23%, in both instances) were that ending 11th February and that ending 14th October. On other five occasions the weekly percentage exceeded one, once in January, twice in February, once in March, once in September and once in October. There were four complete weeks, one in April, one in September and two in December, when no positive rats were found. The longest period without a positive finding was thirteen days, from 11th to 23rd April inclusive.

The Signs of Rat Plague.—Every rat and shrew (53,961 animals) was dissected and a spleen smear from each was stained and examined under the microscope. When suspicion attached to the animal, after dissection, additional smears were stained and examined. Mr. J. Bunkall, of the Health Service, was responsible for the bulk of this work.

General Congestion.—This was present in 222 cases in nine of which it was described as " slight ". Most of the remaining twenty-eight positive rats were in a putrid state.

Buboes.—A bubo was present in 201 cases. Table III shows the distribution of the bubo or buboes.

TABLE III.

SHOWING SITES OF BUBOES.

Site of Bubo.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Right cervical	4	10	16	...	2	3	1	1	4	...	1	...	42
Left „	11	11	3	1	1	1	...	4	4	6	...	1	43
R. and L. cervical	8	6	7	1	3	2	7	2	3	2	1	1	43
Right axillary	...	1	1	...	1	1	...	...	...	...	1	...	5
Left „	1	4	...	2	...	...	...	2	...	...	...	...	9
Right groin	...	...	...	1	...	...	1	1	1	1	1	1	7
Left „	...	...	...	...	1	...	...	...	...	1	1	...	3
Mesenteric	5	1	4	...	3	1	3	4	2	4	2	...	29
R. groin and lumbar	3	4	2	...	...	1	1	...	1	...	...	...	12
L. „ „ „	1	...	...	...	...	1	...	...	...	...	...	...	2
R. and L. groin and lumbar ...	1	...	...	...	...	...	...	...	...	...	...	...	1
R. cervical and axillary ...	...	...	1	...	...	...	...	...	...	...	...	...	1
L. „ „ „	...	...	...	...	...	...	...	...	...	1	...	...	1
L. „ „ R. axillary ...	...	...	1	...	...	...	...	...	...	...	...	...	1
R. „ „ L. groin ...	...	...	...	...	...	...	...	...	1	...	...	...	1
R. axillary and lumbar ...	...	...	...	...	1	...	...	...	...	...	...	...	1

A cervical bubo was present in 132 cases, cervical only in 128 and in association with a bubo in another site in four cases. An axillary bubo occurred in eighten cases, in fourteen of which it was single. Groin buboes numbered twenty-six and in only ten cases was the bubo single. Lumbar buboes were noted in sixteen cases, and in all instances they were associated with a bubo in another situation. A mesenteric bubo was observed in twenty-nine cases. This is interesting in connection with the question of the mode of infection and it may be not without significance that an inflamed condition of the intestines, with blood-stained contents was present in twenty-eight of these cases, and in the remaining case the putrid condition of the rat rendered the condition, if present unrecognisable.

There were forty-nine cases in which no bubo was observed. Of this number, twenty-one were in a more or less advanced stage of putrefaction which made accurate examination difficult, other four were partly eaten and another had the head crushed to pulp.

There were, therefore, twenty-three cases in which there was no bubo to be seen. Only one positive rat was noted in the returns as " missed at P.M.," the diagnosis having been made from the routine spleen smear, stained and examined under the microscope.

Pleural effusion.—This was present in 218 cases, in sixty-six of which it was described as " haemorrhagic." As with the other signs of plague, this feature undoubtedly would have been more frequently noted had all the infected rats been in a fresh state at the time of examination.

The Spleen.—Even in a fairly advanced stage of putrefaction of the rat, this organ could be said to be enlarged and in a fresh rat, intense congestion was present.

The Liver.—This organ had a " speckled " appearance in 103, a " mottled " appearance in seventy-one, was " congested " in ten, had eaten away in one and was " putrid " in sixty-five cases.

The Suprarenals.—These showed congestion in 147 cases.

Intestinal haemorrhage.—Haemorrhagic intestinal contents were observed in forty cases. A mesenteric bubo, as noted above, was present in twenty-eight, and of the remainder, no bubo was seen in eight, groin and lumbar buboes were present in two, a cervical bubo was present in one, and a groin bubo in one.

Subcutaneous haemorrhage was seen in the cervical area in twenty-one cases in seven of which there was haemorrhage also in the flank. In the axillary region, subcutaneous haemorrhage was observed in four cases, in one of which there was haemorrhage also in the flank, and in two cases haemorrhage was present only in the flank. There were 2,852 pregnant rats in the total examined. The proportion was lowest in January (one pregnant rat in twenty-nine) and was highest in October and November (one pregnant rat in twelve. It was shown by means of a graph, in the 1929 report, (Annual Medical and Sanitary Report, Nigeria, 1929, Appendix A p. 10) that when the incidence of plague in rats is low the pregnancy rate is high, and *vice versa*. For the first part of 1930 this would appear also to be the case. During the greater part of the year however, the plague figures were comparatively low and the pregnancy curve corresponds instead of diverging.

RAT FLEAS.

Rat fleas were obtained from two sources, (a) from live rats sent to the Research Institute, and (b) from dead rats taken to the dissecting station. The live rats afford reliable figures. From 621 live rats 1,971 fleas were obtained a proportion of 3.17 fleas per rat, over the year. *Xenopsylla cheopis* preponderated over *Xenopsylla brasiliensis* in the proportion of 818 males and 546 females to 368 males and 237 females. The only other flea obtained from live rats was *Ctenocephalus canis*, of which there were two females. The monthly figures are set out in Table IV.

TABLE IV.

Month.	X. Cheopis.		X. Brasiliensis.		C. Canis.	Rats examined.	Fleas taken.	Fleas per Rat.	
	♂ %	♀ %	♂ %	♀ %	♀ %			Cheopis	Brasiliensis.
January ...	30·85	18·79	34·75	15·60	—	47	282	2·96	3·02
February ...	34·83	13·48	39·88	11·78	—	37	178	2·32	2·48
March ...	52·83+	38·67	+4·71	3·77	—	19	106	5·10	0·47
April ...	53·77	37·73	3·77	3·77	0·94	25	106	3·88	0·32
May ...	43·71	32·33	10·17	13·77	—	79	167	1·60	0·50
June ...	53·20	32·72	7·95	6·11	—	112	327	2·50	0·39
July ...	43·68	32·49	11·91	11·55	0·36	123	277	1·70	0·52
August ...	32·86	25·87	27·27	13·98	—	80	143	1·05	0·73
September...	27·57	27·10	20·09	25·23	—	39	214	3·00	2·48
October ...	53·52	22·53	19·71	4·22	—	27	71	2·00	0·63
November...	40·38	25·00	21·15	13·46	—	15	52	2·26	1·20
December...	47·91	27·08	14·58	10·41	—	18	48	2·00	0·66
Total ...	41·50	27·70	18·67	12·02	0·10	621	1,971	2·16	0·97

Other ectoparasites from live rats were 259 *Laelaps echidninus* and 135 *Haematopinus sp.* From the dead rats 6,246 fleas were obtained, of which there were 2,431 male and 1,790 female *Xenopsylla cheopis* and 1,147 male and 870 female *Xenopsylla brasiliensis*. Other fleas found were four female *Echidnophaga gallinacea*, three female *Xenopsylla aequisetosus* and one female *Ctenocephalus canis*. This is the first occasion on which *Xenopsylla aequisetosus* has been found on the Lagos rats. Other ectoparasites were 483 *Laelaps echidninus* and five *Haematopinus sp*

INTESTINAL COCCIDIOSIS.

Coccidiosis was first reported in Nigeria in 1922 when two cases were met with. The occurrence of the second case led to a review of the literature and it was shown that from the year 1860 until 1922, one hundred and fifty-four cases had been reported, all but three of these having occurred between the years 1915 and 1922. In August of this year (1930) a third case was found in Nigeria, the patient, an Englishman, showing also active and encysted Entamoeba histolytica and Charcot Leyden crystals in the stools. A further search of the literature showed that between 1923 and the present date sixteen (perhaps seventeen) additional cases have occurred in various parts of the world. This third case in Nigeria would appear to be the latest and will form the subject of a contribution to the *West African Medical Journal.*

MUSCLE ABSCESSES.

In response to a circular letter many medical officers were good enough to send thick blood smears, taken by day and by night, from their cases of muscle abscess. Material from fifty-seven cases was received during the last five months of the year. The thick smears were dehaemoglobinised, dried, fixed, and then stained with haemalum. Filaria embryos were found in smears from thirty-four cases, *i.e.* 59.64 *per cent.* In the majority of cases the embryos were those of *Acanthocheilonema perstans.* This is not to be taken as proof that " muscle abscess " is due to filaria. In some parts of Cameroons well over sixty *per cent.* of the population harbours filaria, and the present figures are given only as a record of work done in the investigation of this interesting condition. Smears from the abcess pus were received from eight of the cases and staphylococci were present in all and appeared to be the only organism present.

BLACKWATER FEVER.

Nineteen cases of blackwater fever were notified during the year, but other cases may have occurred. The actual case reports supplied were not all complete in detail, in part because this was impossible in certain instances and in part because the schedule has been altered in form from that previously in use.

The data which follow have been taken from the reports submitted, supplemented where possible by further inquiry.

Sex.—There were three females (one a Yoruba).

Age.—The age varied from fourteen years (a Syrian boy) to fifty-seven years (a Swiss Lady Missionary). The actual ages were :—14, 22, 24, 26 (two), 27, 29, 30, 32, 34 (two), 35, 37, 39, 42, 50, 52, 53, and 57 years.

Nationality.—There were five English, three Scots, two Irish, one Welsh, three German, one Dutch, one Swiss, one Syrian, one Egyptian, and one Yoruba.

Occupation.—There were three German employees in Cameroons plantations, three Roman Catholic priests, two Europeans engaged in trade, one Protestant lady missionary, one English sailor, one tin-miner, one married Englishwoman, one Egyptian trader, one married Yorubawoman and one Syrian schoolboy. There were four Government officials, two in the Public Works Department, one in the R.W.A.F.F., and one in the Railway Department.

Season.—Three cases occurred in January, one in March, three in April, one in May, one in July, three in August, two in September, two in November, and three in December.

Locality.—Nine cases were reported from the Northern Provinces, at or near Ilorin (2), Kano (2), Lokoja (2), Ankpa (1), Jos (1), and Zaria (1). Six cases were notified from the Southern Provinces, at or near, in one case each, Benin City, Ibadan, Ijebu Ode, Lagos, Opobo, and Warri. Four cases occurred in British Cameroons, two near Kumba and two near Victoria.

Mortality.—There were eight deaths, one in May, two in August, two in September, and three in December. In one case (an Egyptian aged fifty years) it was the third attack. In two cases the patient had had twenty-five years experience of Nigeria, with no previous history of blackwater fever (a lady missionary aged fifty-seven and an English trader aged fifty-three). In one case (an Irish priest) the patient had served four years continuously in Nigeria. In one case (an English sailor) the patient had been for " many years " to and fro West Africa on steamships. In one case there were ten years' and in another four and a half years' experience of Nigeria. No information was obtainable in the eighth case.

Number of Attacks.—In two cases the present was the third attack (one death), in two it was the second attack (both recovered), in one case no information was obtained (died) and in the remainder (fourteen) it was definitely the first attack (six deaths).

Previous experience in Malarious countries.—This amounted to a life-time in three (the Egyptian, the Yoruba and the Syrian), twenty-five years in two cases, " many years " (in steamships) in one case, twelve years in two cases, ten years in two cases and nine years in one case. In the remaining cases the period was, four and half years, four years, three and one quarter years, three years, twenty-seven months, nineteen months and eight months respectively. In the remaining case no information was obtained.

Length of present tour.—Excluding three cases in which the whole life had been spent in a malarious country, and the sailor who voyaged regular between Lagos and Liverpool, this period was two months, five months (two cases), six months, seven months, eight months, twelve months, seventeen months, eighteen months, nineteen months, twenty-three months, twenty-seven months, thirty-nine months, and four years, respectively. In the remaining case no information was available.

Malaria history.—This varied from " occasional attacks," " low fever " and "some malaria " to " repeated attacks " and " much malaria," with the exception of two cases in which no information was supplied

Quinine prophylaxis.—In three instances the habit was to take fifteen grains of the hydrochloride in one dose every fourth day (the German planters). In two cases it was stated that five grains were taken regularly every day, in two cases (the Egyptian and the Yoruba) no quinine was taken, in one case there was no information and in the remainder, quinine was taken irregularly, either " seldom " or " only when ill."

Quinine and Onset of Illness:—

Case 1.—History scanty.

Case 2.—A regular five-grain taker. Had fever for a few days but kept at work. On 14/1/30 took twenty grains tabloid quinine in divided doses during day and at night twelve grains in liquid form. One hour and a half after last dose he passed black urine. Urine cleared in four days. This patient had had no tropical experience other than nineteen months continuously in Nigeria.

Case 3.—Third attack of blackwater fever. Did not take quinine. Brought to hospital with dysentery of five days' duration. Two days after admission given five grains quinine in tabloid form and eight hours later, without rigor but with rise of temperature to 103°F, passed black urine. Urine cleared in thirty-six hours, but there was a short relapse of twenty-four hours on the day after clearing, during which relapse malaria parasites were found in the blood. He was immediately put on one grain quinine, the dose being doubled each day until ten grains taken daily. Had been twelve years in Nigeria and present tour was of twenty-three months' duration.

Case 4.—Irregular five grain taker. Had not felt well for a month. Took five grains quinine in tabloid in evening, feeling of " fever " next morning, unable to continue work, went home to bed and fifteen hours after the dose of quinine passed black water. Had two remissions, one after forty-two hours and another forty-eight hours later, urine clearing after four days. Had been twelve years in Nigeria and the present tour was of five months' duration.

Case 5.—Took fifteen grains quinine in one dose every fourth day. Had slight fever and took ten grains. Eleven hours later passed black water. Urine cleared in twelve hours, remained clear twelve hours, darkened again for thirty-six hours, cleared for twelve hours, darkened again for eight hours and then remained clear, each relapse being accompanied by a rise of temperature. Had been twenty-seven months in Cameroons, with no previous tropical experience.

Case 6.—Seldom took quinine. Felt ill and took ten grains quinine in evening. Fourteen hours later passed black water. Urine cleared in fifty hours. Had been thirty-nine months in Nigeria, his first experience in the tropics.

Case 7.—Seldom took quinine. Brought to out-patients with fever and put on five grains liquid quinine twice daily. Four days later re-appeared at out-patients. Had passed black water six hours after first dose of quinine on 4th day of treatment. Urine cleared in forty-eight hours, after a slight remission at the beginning of the second day. Was born in Syria and had spent one and a half of his fourteen years in Nigeria.

Case 8.—An irregular quinine taker. Felt ill for two days and took twenty grains quinine on evening of first day and thirty on morning of second. Twelve hours later passed black water. Died of suppression on fifth day. Had spent four and a half years in Nigeria, present tour five months and no previous tropical experience.

Case 9.—Took fifteen grains quinine every fourth day. Felt ill for three days, with high temperature. Given fifteen grains first night, repeated on second night and ten grains next morning. Six hours later passed black water. On fourth and fifth days, no urine was passed but on 6th day 10 cc of yellow urine was obtained by catheter. Thereafter urine gradually increased in amount. The case was complicated by an active gonorrhoea.

Case 10.—A Yoruba woman, took no quinine came to hospital complaining of abdominal pain and difficulty in micturition of one day's duration. On admission passed black water which cleared in four days.

Case 11.—Seldom took quinine. Had " slight fever " and took five grains quinine. He passed black water six hours later. The patient died after four days, the urine showing no signs of clearing. He had completed four years of continuous residence in Nigeria, his first experience of the tropics.

Case 12.—History scanty.

Case 13.—History nil.

Case 14.—Egyptian. Third attack of blackwater fever. Seldom took quinine. Admitted to hospital with fever of two days' duration. Given six grains by intramuscular injection and five by mouth on first evening after admission, and five grains by mouth morning and evening next day. Twelve hours later passed black water. Urine cleared after five days but diminished in quantity and death from suppression on ninth day.

Case 15.—Second attack of blackwater fever. Did not take quinine regularly. Had fever for which she took five grains quinine on three successive evenings, then five twice in the day for one day, and then three grains five times in the day for one day. She passed black water nine hours later. The haemoglobinuria lasted only eleven hours. Had been nine years in Nigeria and seventeen months present tour, no other tropical experience.

Case 16.—Second attack of blackwater fever. Irregular quinine taker. Had fever for two days and on the second day took ten grains quinine twice. Ten hours later passed black water. Urine cleared in thirty-six hours remained clear for forty-eight hours then relapse of twelve hours. Had spent ten years in Nigeria, and present tour, two months.

Case 17.—Was not in the habit of taking quinine and had none for three weeks before onset of blackwater fever. Passed very little urine and died in three days.

Case 18.—Sailor. Took quinine only when in port at Lagos. Felt " tired " for several days. Had five grains quinine in liquid form thrice in day and passed black water four hours later. Suppression set in on third day and death occurred on the fifth day.

Case 19.—No history.

Results of blood examination.—Subtertian parasites were found on the first day of haemoglobinuria in three cases. In another case they were found during a relapse and in a fifth case they were found during a rise of temperature a week after haemoglobinuria had ceased. The blood was examined on the first day of haemoglobinuria in six cases with negative results, on the second day in two other cases and on the third in two other cases, also with negative results.

Differential leucocyte counts were done in seven cases, but the findings did not differ from those given in previous reports.

ENTOMOLOGY.

Mosquito larvae.—There was a considerable decrease in the number of collections of mosquito larvae received from the Medical Officer of Health, there being 641 collections for the year, as compared with 442 for six months in 1929. The collections were obtained from thirty-six different kinds of receptacle or sources, and contained sixteen different species. The sources were barrels, basins, baths, bottles, borrow-pits, calabashes, canoes, catchpits, cement floors, coconuts, crabholes, drains, drums, dustbins, filters, flower vases, ice-chests, jugs, kettles, pails, pans, pits, pools, pots, sinks, swamps, standpipes, tanks, tarpaulins, tins, tree-holes, tubs, tyres, trowels, watering-cans, and wells.

The identifications were :—*Aedes africanus*, *A. argenteus*, *A. irritans*, *A. luteocephalus*, *A. nigricephalus*, *A. punctothoracis*, *Anopheles gambiae*, *Chaoborus sp.*, *Culex cinerellus*, *C. consimilis*, *C. decens*, *C. duttoni*, *C. fatigans*, *C. grahami*, *C. nebulosus*, *C. quasigelidus*, *C. rima*, *C. thalassius*, and *Lutzia tigripes*. Only one species was present in 588 collections, and two species in fifty-one, while there were three species in two collections. *Aedes irritans*, *A. punctothoracis*, *Culex cinerellus*, and *C. grahami* were only found associated with other larvae but all the others were found alone in a collection as well as in association with other larvae, with the exception of *Lutzia tigripes*, the active cannibalism of which probably accounted for the isolation.

Aedes argenteus occurred in 280 collections, *Culex nebulosus* in 149, *Anopheles gambiae* in 135, *Culex decens* in 58, *Culex thalassius* in 22, *Aedes nigricephalus* in 11, *Culex fatigans* in 10, *Lutzia tigripes* in 7, *Aedes luteocephalus* and also *Culex duttoni* in 5, *Culex quasigelidus* in 3, *Aedes africanus* in 2, and *Culex rima*, *Culex consimilis*, and *Chaoborus sp.* each in 1 collection. *Culex cinerellus* was found twice, both times along with *Aedes argenteus; Aedes irritans* was also found twice, along with *Aedes nigricephalus;* while *Aedes punctothoracis* and *Culex grahami* were found only once.

There were 101 collections in January, 102 in February, 41 in March, 63 in April, 59 in May, 34 in June, 53 in July, 37 in August, 16 in September, 80 in October, 27 in November and 28 in December.

Collections of larvae were made from time to time, in the " bush " between Yaba and Agege. The larvae of *Culex moucheti*, Evans, were found in bamboos, this being the first occasion on which the mosquito has been reported from Nigeria. In pineapples the larvae of *Uranotaenia ornata* were found in great numbers along with species of *Harpagomyia.* As no reference to a description of these larvae could be found, they were described and figured for publication.

Mosquitoes.—Collections were kindly sent by Dr. Cauchi from Ikoyi and Lagos and by Dr. Oluwole from the Infectious diseases hospital at Yaba. There were *Anopheles gambiae* 20♂♂, 2,067♀♀, *A. umbrosus* 8♀♀ and *A. pharoensis* 2♀♀. The *culicines* numbered 318 males and 1,111 females, being mostly *Culex nebulosis* but including, also, examples of *Aedes africanus, A. apicoannulatus, A. argenteus, A. domesticus, A. irritans, A. nigricephalus, Banksinella punctocostalis, Culex decens, C. fatigans, C. grahami, C. rima, C. thalassius, Cyathomyia fusca, Hodgesia sanguinis, Taeniorhynchus annetti, T. aurites, Uranotaenia annulata* and *U. balfouri.*

All the female anophelines were dissected and the findings were :—January 33, one with sporozoites in the salivary glands; February 2, one with filaria in the thoracic muscles; March 37, all negative; April 113, one with a double infection, sporozoites being present in the salivary glands and filarial developmental forms in the thoracic muscles; May 672, three with oöcysts on the stomach wall, two with a heavy infection of sporozoites in the salivary glands and four with filaria in the thoracic muscles; June 389, seven with oöcysts on the stomach wall, three with sporozoites in the salivary glands, and seven with filaria in the thoracic muscles; July 534, six with oöcysts on the stomach wall, one with oöcysts on the stomach wall and sporozoites in the salivary glands, two with sporozoites in the salivary glands, and ten with filaria in the thoracic muscles (five heavily infected); August 71, one with oöcysts on the stomach wall and four with filaria in the thoracic muscles; September 6, no infections; October 163, no infections and November 57, no infections. No mosquitoes were received in December.

Malaria infections were 3.03% in January, nil in February, nil in March, 0.88% in April, 0.74% in May, 2.57% in June, 1.66% in July, 1.40% in August, nil in September, nil in October and nil in November.

Filarial infections were in January, 50% in February (only two anophelines received), nil in March, 0.88% in April, 0.59% in May, 1.79% in June, 1.87% in July, 5.63% in August, nil in September, nil in October and nil in November.

A collection of 238 *Anopheles gambiae* was received from Apapa, in April; one had filaria in the thoracic muscles and one had oöcysts on the stomach wall.

A collection of forty-six *Taeniorhynchus africanus* was dissected and structures indistinguishable from sporozoites were found in the salivary glands of two.

Occasional experiments.—In several cases where sporozoites were numerous in the salivary glands of *A. gambiae* an emulsion of the glands in 0.5 to 1cc of normal saline was injected into a monkey. The results were negative.

Several attempts were made to infect clean anophelines by feeding them on Bass cultures of the subtertian parasite, with and without an admixture of honey. The results were negative.

Feeding experiments on various species of mosquitoes with blood containing embryos of Wuchereria bancrofti. By the kindness of Dr. J. C. Paisley a Hausa with a light infection of bancrofti embryos was obtained from Gadau. Systematic examination failed to reveal any other type of embryo in the blood, and feeding experiments were begun on 18th September, using freshly hatched *Taeniorhynchus africanus*, in the first place. Afterwards *Anopheles gambiae* and *Aedes argenteus* freshly hatched were used and in much small numbers, freshly hatched *Anopheles mauritianus A. pharoensis* and *A. marshalli*, *Aedes africanus*, *Banksinella luteolateralis*, *Culex fatigans* and *Eretmopodites chrysogaster*. Each mosquito was fed separately in a wide-bore test tube, the open end having fine mosquito gauze fixed over it. The tubes were afterwards kept in wire-baskets in the dark, in a moist atmosphere and were kept alive either on sugar-water or on blood meals from a guinea-pig.

The table shows the percentage which became infected.

TABLE V.

Mosquito.	Night feed.	Morning feed.
Taeniorhynchus Africanus	129 fed, 56·57% inf.	89 fed, 34·83% inf.
Anopheles gambiae	138 fed, 44·92% inf.	52 fed, 7·69% inf.
Aedes argenteus	53 fed, 33·96% inf.	3 fed, 0 inf.

One *Anopheles pharoensis* fed at night and one of three *Anopheles mauritianus* fed at night, became infected. The following, fed at night, were negative, *Culex fatigans* 5, *Banksinella luteolateralis* 2, and *Aedes africanus* two.

The following fed in the morning (7.30-9), *Anopheles marshalli* 1, and *Lutzia tigripes* 1, and both became infected but *Banksinella luteolateralis* 1. *Eretmopodites chrysogaster* 1 and *C. fatigans* 1, were negative. The higher rate of infection in the case of *Taeniorhynchus africanus* is most likely due to its greater capacity and avidity for blood, and the lower rate of infection resulting from morning feeds as compared with night feeds can be explained by the smaller number of embryos in the morning blood. Development up to the stage of entering the proboscis was obtained with *Anopheles gambiæ*, this stage being reached in 12 days. The single examples of *Anopheles pharoensis*, *Anopheles mauritianus*, *Anopheles marshalli*, and *Lutzia tigripes* which became infected showed forms of typical of the period of development. In the case of *Taeniorhynchus africanus*, and *Aedes argenteus* however, up to 15 days in the former and 9 days in the latter the developmental forms seen corresponded to a 2-3 days' old form as seen in ***Anopheles gambiæ***. In other words, it would appear that in these two species, under the conditions of the experiments. the larval forms although remaining alive and active did not progress in the development after the third day.

S. L. M. CONNAL.

DERMATOLOGY.

Very few skin conditions were seen at the African Hospital, Lagos, during the first six months of the year and nothing of special interest was observed. Permission was obtained to visit Benin in order to study the varied manifestations of yaws. Numerous clinical photographs were obtained and these were incorporated in a paper published in the *West*

African Medical Journal for July 1930. Whilst in Benin, three *Macacus rhesus* monkeys were inoculated in the testis with an emulsion of portions of tissue removed from yaw-eruptions and which showed numerous spirochaetes on dark-ground illumination. No evidence of infection was noticed on examination of the animals six months later.

Tropical ulcer.—The relationships of the various organisms prevalent in tropical ulcer to its causation was considered worthy of an investigation and this work is still in progress. At first, experimental inoculation of the material obtained from such ulcers was carried out in native volunteers. The inoculations were made intra-cutaneously and about 0.5cc of material was used in each case. Positive results were obtained in six cases. By positive result is meant the production of an ulcer similar clinically to those occurring spontaneously, and showing microscopically fusiforms and spirochaetes in abundance. Two of the volunteers were undergoing N.A.B. treatment, thus showing that this drug exercised little or no effect when administered intravenously. All those inoculated had previously suffered from tropical ulcer at various times, showing that little or no immunity had developed. One of the experimentally-produced ulcers remained active for twenty-one days, spirochaetes and fusiform bacilli being present in large numbers throughout the entire period. From most of the cases of tropical ulcer seen in Lagos, bacilli of the pseudomonas type could readily be isolated, and inoculations of a pure culture of this organism were made in two natives. A boil-like lesion occurred in both, without ulcer formation. Attempts were next made to obtain cultures of the spirochaetes, and after trying various media, it was eventually found possible to cultivate the organism in a modified Wenyon medium, consisting of agar, saline, and whole human blood. The spirochaetes grew best under aerobic conditions. Grown anaerobically, the spirochaetes tended to die out, whereas the fusiforms increased in number. The cultures were not pure, being contaminated with pseudomonas. So far, pure cultures have not been obtained. The mixed cultures of spirochaetes and fusiforms have been maintained over periods varying from three to eight months, sub-cultures being made every four or six days. In dark-ground examinations of material taken from ulcers, a third type of organism was noticed in many cases and to be present in excess in a certain number. In appearance, the organism is a long slender motile rod, resembling a somewhat obese spirochaete, devoid of convolutions. It is capable of movement in either direction, and possesses as well a slow characteristic loping or caterpillar-like motion. It is Gram-negative, and since it has not been obtained in pure culture it is impossible to say whether it represents a stage of the fusiform bacillus, or is a separate entity. Experimental inoculations were made with the mixed cultures. Five volunteers were obtained, each receiving 0.5cc of culture material intracutaneously. Ulcers were produced in all five inoculations, and resembled the type known as tropical ulcer. No definite conclusions can be drawn from such experiments until pure cultures can be obtained, and this problem is now receiving attention.

E. C. SMITH.

Intestinal Complaints.

In the latter half of the year, work was resumed on the investigation of diarrhoeas and dysenteric complaints in Lagos. As during the previous year, attention was directed chiefly towards such cases as were not diagnosed as due to *E. histolytica* by the Pathologist, although in a few instances an investigation of the intestinal flora was made in this latter type of case. Cases of bacillary dysentery were less frequent than during the corresponding period of 1929. Only from seven cases were Flexner strains isolated, and none of the other classical types was observed.

In addition to cases of amoebic and bacillary dysentery, where the the cause was evident, there were a number of cases closely simulating bacillary dysentery in the macroscopical and microscopical appearances of the stool, and also in the clinical aspect of the cases. In these cases it can be claimed that dysentery bacteria were not present, at least in numbers detectable by routine methods at the time the case first came under observation. The most striking fact was the constant appearance, in varying numbers, of late lactose-fermenting coliform organisms. The presence of these bacteria has been noted by many observers, and the weight of opinion is against their playing an active role, but in view of the work of Dudgeon and Pulvertaft a number of strains were isolated and examined, several being taken from each case. The work is incomplete and is being continued, but several points may be noted at this stage.

(1) These late lactose-fermenters are not confined to one type, and more than one type may be found in the same case. This is significant in view of the fact that cases occur in groups, suggesting infection by a common virus. The inference is that the late lactose-fermenters are not the invading organisms though they may play some part after infection has taken place.

(2) The true B. coli types present in the stools for the most part have a roughish appearance on first isolation, although subcultures in broth produce a smooth growth.

(3) Apart from lactose and dulcite, the fermentation reactions of the late lactose-fermenters show a strong resemblance to those of the main B. coli types. (The action on dulcite appears to be correlated with the extent of the delay in lactose fermentation).

(4) Tests for haemolysis proved disappointing. Some of the strains were haemolytic for rabbit's blood as evidenced by their action on blood-agar plates. Very few showed haemolysis when human blood was substituted for rabbit's blood. It is possible, and indeed probable, that a larger number of positive results would be obtained if the more delicate technique advised by Dudgeon and Pulvertaft were adopted, but the inconstancy of the fermentation reactions suggested that the presence of the late lactose-fermenters was not the result of case-to-case infection, and that the question of haemolysis might be left for consideration later. While there is little evidence that these late lactose-fermenters play an active role, it is felt that they are worthy of study, and that if an explanation for their presence can be found, a real advance may be made towards the solution of para-,meta- and pseudo-dysentery. Variation in fermentative power of members of the typho-coli-dysentery group, as a result of the action of various agencies, is an accepted fact. It is claimed by d'Herelle that bacteriophage can induce increased fermentative powers in Shiga's bacillus and, while this has not been corroborated, the influence of phage in producing other types of variation is well established. It is not inconceivable that the cases under consideration are really cases of true bacillary dysentery where the invading organisms have come early under the influence of a powerful bacteriophage, which attacks the normal flora as well, causing an increase in variants and, possibly, mutants.

Other Organisms.—A number of types have been isolated, some saccharolytic, others non-saccharolytic. Of these, *Pyocyaneus* appears the most important, possibly owing to its pathogenic properties, possibly owing to its lysogenic properties.

Flexner Strains.—As noted above, the tale is a small one. Of the seven strains isolated, four (strains 180, 182, 190 and 293) were type W. Strain 278 agglutinated to sixty-six *per cent.* of the titre for type W but did not agglutinate with an absorbed type W serum. Strain 191 was a "Lagos" strain (*vide* Annual Report 1929) giving the same agglutination reactions as the twelve Lagos strains found last year. Strain 187, although agglutinating macroscopically with a high titre group Flexner serum, reacted only with a Z serum to any appreciable extent. Strain 191 was from a European in whom the disease ran a very severe and protracted course. Synovitis was so pronounced as to necessitate aspiration. The synovial fluid was sterile. Strain 191 was agglutinated by the fluid in a titre of 1/80. This was in the fifth week of the disease. The blood serum, taken a day or so later, agglutinated strain 191 in a titre 1/160. Tested against the type strains, the titres were as follows :—

V, 1/20, W, nil 1/20, X, 1/80, Y and Z, nil 1/20.

Lytic Filtrates.—The possibility of obtaining a serum reaction with a lytic filtrate of a patient's organism was investigated and the result obtained in the first case tried was encouraging. A filtrate of an 18-hour broth culture of the patient's faeces was tested for phage action on V, W, X, Y and Z types and also on the patient's organism. The filtrate proved potent for Z and the patient's organism, less so for W and X. As a preliminary test, the lytic filtrate of the Z culture was tried against a Z serum with an agglutinating titre of 1/3200. There was evidence of a serum reaction barely amounting to a precipit in reaction, the tubes affected showing a marked opalescence as compared with the other tubes in the series. The tubes affected were those containing the dilution 1/40, 1/80 and 1/320. The tube containing the dilution 1/160 was negative. N.B. the presence of zones of no reaction suggests that use might be made of lytic filtrates in the antigenic analysis of closely allied strains. The patient's serum was then taken on the sixth day of his illness and tested for agglutinins. None was observed even as low as 1/1. The serum was then put up against descending dilutions of a lytic filtrate of the patient's organism and in descending dilution against undiluted lytic filtrate. The same reaction was obtained as in the case of the Z filtrate. A marked opalescence was evident in a ratio of 1/1, the opalescence tailing off to clear tubes in either direction. No opportunity was afforded of repeating the experiment until late in the year, and that in a case where the serum was obtained late in the clinical course. The serum showed the abnormally high agglutinating titre of 1/1,000. No phage was obtained from the patient's faeces, and a lytic filtrate of the patient's organism was obtained by means of a phage from pig's fæces. The results were not so clean cut as in the former case. In place of opalescence there was a fine granularity spread over a number of tubes. In spite of the high agglutinating titre of the serum, the maximum reaction still appeared to be in the region of 1/1.

J. A. YOUNG.

TROPICAL ULCER.

An enquiry on the subject of tropical ulcer was continued during the earlier part of the year. Observations on this subject are to appear in the *West African Medical Journal* (April, 1931).

Relapsing Fever.

The remainder of the year was mainly occupied by a study of relapsing fever. Fifty cases of the disease were encountered during the routine examination of bloods at the African hospital, Kano. More than half of these cases (26 in number) occurred during the period from 13/3/30 to 15/4/30; the others appeared sporadically throughout the remainder of the year.

A small outbreak also occurred in the city prison in the months October to December. The African hospital cases consisted mainly of natives of French country, chiefly railway construction labourers. The disease manifested itself as a single attack, or as an attack and one relapse. (Clinical histories are notoriously unreliable but their accuracy in this respect is substantiated by observations of experimental human infections. Of twelve such infections, nine resulted in a single attack, two showed an attack and one relapse, and the remaining case showed an attack, a first relapse and a second relapse). Experimental attacks approximate closely in all respects to the naturally-occurring disease. The usual course of events, following intramuscular injection in man of 0.5 cc infected blood, is as follows :—

On the third day after injection the patient's temperature suddenly rises within a few hours to 105-106°F, accompanied by a feeling of chill and pains all over the body. A severe headache rapidly supervenes and continues throughout the attack.

The temperature remains up, with morning remissions of from 1-4°F, for three or four days, and then falls by crisis frequently to 1 or 2°F below normal, with signs of collapse which in some cases is extreme. The patient, as a rule feels remarkably well after twenty-four hours, though considerable weakness and aches in the limbs and back frequently persist for a week or more. The relapse (if any) occurs in from eight to ten days (generally ten days) after the end of the original attack. The relapse in the majority of cases is an exact duplicate of the original attack. Some degree of bronchial irritation is present in all cases and may proceed to pneumonia. Nose-bleeding and vomiting are frequent. Jaundice is more or less marked in most cases. Dysenteric symptoms have been noted in several instances. The spleen and liver are enlarged and tender. Examination of the blood after experimental inoculation often shows spirochaetes in small numbers within twenty-four hours. These steadily increase in numbers until the temperature rises, and then much more rapidly throughout the attack. Towards the end of the attack spirochaetes are present in large numbers, and generally many are seen in large tangled masses at this stage. The spirochaetes generally disappear just before or during the fall of temperature, though they have been noted in small numbers three days after the fall.

Neosalvarsan and similar preparations appear to have little effect in treatment unless administered during the first two days of fever; given later they have little or no effect on the course of the temperature, and spirochaetes have been found in abundance in blood taken twenty-four hours after such injections. Relapses also are common after neosalvarsan treatment. As illustrating the failure of neosalvarsan as a prophylactic, a case may be quoted in which an experimental injection of infective blood into a human subject resulted in spirochaetes appearing in the blood within seventy-two hours despite the fact that the man had received five injections of neosalvarsan (each of 0.6 g) at weekly intervals before the experiment, the final injection having been administered eighteen hours previous to the inoculation of infective blood. Experiments have been performed with human and animal subjects with a view of determining the type of immunity resulting from infection with relapsing fever spirochaetes, viz, whether the immunity is a true humoral immunity or merely an infection immunity, *i.e.*, an immunity resulting from a balance established between persisting spirochaetes and tissue resistance. (It may be mentioned that experiments in mice and man point to the existence of several strains of spirochaetes in the relapsing fever encountered in this district). Experiments have been made chiefly with locally-caught mice and the conclusion arrived at is that the immunity is a true humoral immunity as shown by the following facts :—(*a*) Smears and sections of tissues, made after the disappearance of spirochaetes from the blood, show no spirochaetes. (*b*) Injection of tissues of recovered mice into fresh mice produces no infection. (*c*) Immunity can be produced in mice by injection of blood containing only dead spirochaetes. It should be mentioned, in connection with these experiments, that the local mice appear except in very rare instances to have only one attack, and that therefore caution is necessary in making deductions applicable to the case of relapsing fever in man. An interesting observation resulting from these mice experiments is that an infection with an original-attack strain appear to protect, not only against further infection with the homologous strain, but also against infection with the spirochaetes producing the relapse in human case infected with this strain. The contrary, however, does not appear to hold good, viz. the relapse strain does not protect against infection with the original strain. Further experiments are being made to confirm these points. It is hoped to continue experiments on human subjects, particularly with a view to confirming the immunising properties of spirochaete-containing blood (kept at room temperature for 24-48 hours, when the spirochaetes become non-infective). The few experiments performed to date, appear to support the findings in the mice experiments. One realises the risk of misinterpreting results which may possibly be due to immunity acquired by a previous attack.

Spirochaetosis in Ducks.

An enquiry into the cause of mortality amongst ducks in a European compound showed the presence of Treponema anserinum in the blood of all ducks examined. Diarrhoea, paralysis and death within three days were the features noted in these cases. Subcutaneous injection of 2 cc of infective blood produced a temporary infection of 24 hours' duration in a *Macacus rhesus* monkey. This is possibly the same disease as was reported by Macfie and Johnston, " A Note on the Occurrence of Spirochaetosis of Fowls in Southern Nigeria ". Ann. Trop. Med. & Paras. Vol. VIII. No. 1 pp. 41-50.

Attempt to Cultivate B.leprae.

A case of leprosy showed numerous acid-fast bacilli in blood from an ear nodule after four months' bi-weekly treatment with ethyl ester chaulmoogrates. An unsuccessful effort was made to cultivate the bacillus by the method described by Shiga, 1929.

R. McC. BURNIE.

DIETETIC RESEARCH.

The Relationship of Geophagy or Pica to Trypanosomiasis in Cattle. In conjunction with the Veterinary Officers, it was shown that their belief that (1) pica is almost invariably a symptom of trypanosomiasis, (2) pica appears in infected animals when the trypanosomes are easily demonstrable in the gland juices and the blood stream, (3) pica is cured by injections of tartar emetic, which is the drug used for curing trypanosomiasis, is correct. Examination of the blood of animals suffering from pica showed that the calcium and phosphorus contents were low. The urines contained exceedingly small amounts of chlorides. Analyses of the femora and ribs of animals which were allowed to die showing pica, gave the following very interesting results.

	Femur.	Rib.
Ash	63.27	50.8
Organic matter	36.74	49.2
Calcium oxide	26.77	24.6
Phosphoric anhydr.	20.4	20.0
Cao/P_2O_5	1.3	1.23
Ash/Organic	1.71	1.03

This average of three analyses shows very gross deficiency of calcium and phosphorus. The ratio of ash to organic matter is very nearly the same as for active rickets. Remembering the fact that the animals were all fully grown, and so softening and bending of the bones was not to be expected, it is clear that the condition is completely analogous to osteomalacia in the still growing animal. Several feeding experiments were also of value. Pica animals that were allowed to graze only, died. With grazing plus bone meal in a 4-oz. bolus, all died. With grazing plus rock salt *ad lib.* all died. With grazing plus bone meal plus rock salt there were no deaths but the animals did not improve in condition with anything like the rapidity of the animals that were treated with tartar emetic. Search of the literature then revealed that in all experimental infections with trypanosomes, one of the outstanding results was a great acidosis. The mechanism of the cause of pica in trypanosome-infected animals now became clear. We know from the work of Gamble, Ross and Tisdall (J.B.C. 1923, 57,632) that the loss of calcium in an acidosis is in excess, and is obtained from the body fluids and, probably, ultimately from the bones. Calcium deficiency is intimately linked with deficiency of sodium and potassium, and the latter bases are thrown out of the circulation in all conditions of acidosis as fixed bases. With a deficiency of calcium there is an accompanying deficiency of phosphorus, as one only cannot be extracted from the bones. The grasses of Nigeria are known to be poor in calcium and phosphorus, and so the extra wastage caused by an acidosis cannot be kept in check by the small supplies of these elements in the natural pasturage. It was now decided to test the effect of intravenous dosage with calcium lactate. Injections of one gram of the drug invariably stopped pica for some days, and some of the cattle continued to show freedom for weeks. The dosage was increased to two grams and the results were still better, but this series of experiments is not yet finished. The Tsetse Investigation has undertaken to examine the CO_2-combining power of pica animals' blood, and along with the urine examinations now under weigh, the case for acidosis will be complete. On examining all the evidence (the Tsetse Investigation also carried out complementary experiments during this period) the Animal Health Committee decided that pica in trypanosome-infected cattle was induced by the acidosis of the disease, accompanied by the fact that the cattle in pica areas are eating a mineral-deficient pasture in which the deficiency of calcium is the primary cause. Along with this experimental work, many analyses of cattle foodstuffs have been carried out for the Committee.

Kaduna Prison Experiments.—The normal prison ration was found to consist of :—

Water	3,843 grams	
Solids	640 ,,	(when evaporated to dryness at room temperature)
	512 ”	(when evaporated to dryness at 100°C).

On Sherman's basis of calculation this gave a calory value of 2,560. This ration was kept as the basal ration to which was added condensed milk, ground-nuts, potassium iodide and chalk, ground-nuts and potassium iodide and chalk, and a fifth group had their basal ration weighed out in accordance with the Government prison-ration scale. The control group was selected by going through the prison roster and taking the first twenty names of prisoners who were not in any of the first five groups. These names were taken after experiments so that they were unknown to the prison staff or to myself until then. For this reason they were in no way interfered with and only their normal routine prison weights were recorded. A further limitation was the choosing of prisoners who had served a full twelve months before the start of the experiments. The weights recorded in the following table are the sums of the differences of the weights of each group of twenty prisoners.

Group.	3-Months' period.	12-Months' period (1929).
(1) Milk	plus 48 lb.	plus 6 lb.
(2) Ground-nuts	„ 32 „	„ 19 „
(3) Potassium Iodide and chalk	„ 34 „	„ 43 „
(4) Ground-nuts and No. 3...	„ 60 „	„ 10 „
(5) Ordinary ration weighed	„ 32 „	„ 10 „
Totals	plus 206 lb.	plus 88 lb.
(6) Controls	plus 19 lb.	plus 11 lb.

These results are exceedingly difficult to interpret. The outstanding gains in weight were both obtained in the groups in which protein and salts were added to the diet (Nos. 1 and 4), and as the salts addition alone did not show such gains, it appears that the protein moiety of the ration was of value. This was expected, as the meat ration is a very small one, and the millets which are the bulk of the food are known to be deficient in biologically-valuable protein, and the analyses of the rations and of the urines of the prisoners showed a protein consumption of only about eighty grams, of which eleven were obtained from meat. It can then be taken that the protein and salts moieties of the prison ration are deficient. There are other grounds for suspecting a deficiency of phosphorus as well as the calcium deficiency shown by low blood-calcium figures. During this period the theoretically-determined deficiency in calories was proved to be correct. The electric cables for lighting Kaduna were being laid, and the prisoners, including my groups, were engaged in "stumping" the lines of trenches. From personal observation it was seen that this was hard labour. Every group lost weight in that week, the total being forty-four lb. As the expected gain was eighteen lb. it will be seen that there was a loss of really sixty-two lb. or very nearly half-a-pound a man. This must have been due to the unaccustomed really hard labour, and so the prison roster was searched. It was found that, through the years, the most weight gained was invariably by cooks and that the least gains (on average a slight loss), were shown by the labourers who split firewood, pulled rollers, and worked outside the prison yard in general. These experiments were designed to obtain basal information for further more detailed experiments. In this way they have served their purpose.

Beniseed.—This product was analysed during the year, the analyses being carried out on seed from Benue Province, Katsina Emirate, and French country north of Katsina. The analyses were in close agreement and showed that this plant exercises a highly selective action on the soil in which it is grown. The seed was shown to contain as much as 1.2 *per cent.* of calcium oxide and 1.39 *per cent.* of potassium oxide. The extraordinary high contents of these minerals, and their ratio of 1/1.16 are very astonishing. As the protein and oil contents are also very high, 23.46 and 52.60 respectively, it is obvious that this seed is one of the valuable foods of the world. Beniseed is quite indifferent to the season in which it is grown, its cultivation is very easy, and it grows in the arid north, so it is proposed to plant this crop to see whether the ploughing-in of the stems of the plants, after reaping the crop, will improve the salt content of our deficient soils. The Munshi use the ash of the stem of the plant as a condiment, and this is a hint as to its usefulness. It is at present being analysed. As the Munshi use beniseed in small quantities but constantly, 200 of these people have been examined. It was found that the average Munshi youth is shorter but decidedly heavier and better proportioned than the Hausa youth. Their teeth are much better, and their fertility rate and viability of offspring are decidedly superior to those of the Hausa. As a race they are the physical superiors of the Hausa mixture. Their short stature is explained by a deficiency of iodide which is well-known to the physicians who work among them. There is also, however, the possibility of their stature being limited by their ancestry, which is different to that of the Hausa, and one in which the law of regression will operate more fully than in such a mixture as the Hausa.

Standard Dietaries for Experimental Animals.—A series of basal diets was designed and each discarded as its value was observed until Diet No. 5 was evolved, which proved so satisfactory that it is being continued as the standard basal ration of the laboratory. It consists of :—

Guinea-corn	2 parts
Beniseed	1 part
Salt (Crude rock)	1 *per cent.*

All are coarsely ground and thoroughly mixed.

Lettuce and spinach are supplied daily, and the nursing mothers are given milk, about 30 cc each per day.

Albino rats, on the above ration, have increased the size of their litters from five to nine, and a few litters of fourteen have occurred. Three cases of superfecundation have been seen as well, and the fertility incidence seems to be normal for the species. It is now only very occasionally that a nursing mother shows signs of xerophthalmia, and cod liver oil cures the condition at once. As far as the time factor will permit, it seems that this ration is, at the most, only slightly deficient in vitamin A, and as this is so easily corrected it is proposed to make it remain as the basal ration.

Guinea-pigs have also thrived well on Diet No. 5. The fertility rate and general health have very greatly improved and there has been a sudden, marked increase in the size of the litters. The numbers are still too small, however, for as definite conclusions to be drawn as in the case of the albino rats. It is generally stated that guinea-pigs do not tolerate fats well, and for this reason it has even been recommended that cod liver oil should not be the vehicle of choice for the administration of vitamin A. Diet No. 5 contains sixteen *per cent.* oil (in the beniseed portion) and yet the herd has improved in every way. Compared with a herd kept under ordinary conditions in the native town of Katsina, the laboratory herd average 2.3 per litter whereas the town herd whose litters are few and far between, average only one per litter. The mortality rate of the young in the town herd is fifty *per cent.*, while in the laboratory herd, amongst the last forty-two born the mortality was 2.5 *per cent.*

W. E. McCULLOCH.

HISTOLOGY.

Forty-one specimens of tumour tissue were received for examination and the results are detailed below.

Table VI.

Benign tumours.—Eighteen.

Adenoma	of Thyroid	1
Cystadenoma	of ovary ...	1
Dermoid cyst.	of pelvis	1
Fibroma	of ear	1
	of forearm	1
	of hip	1
	of foot ...	1
	of abdomen	1
Fibroma molluscum	of face and neck ...	1
Fibro-myoma	of uterus	1
	of ovary	1
Lipoma	of axilla	1
	of shoulder	1
Myxoma (myxomatous degeneration)	of upper jaw	2
Osteoma	of orbital cavity	1

Mixed tumours.—Three.

Mixed tumour	of parotid gland	1
	of upper lip	1
	of jaw	1

TABLE VII.

Malignant tumours.—Twenty.

Adeno-carcinoma	secondary in liver ...	1
	primary in liver	1
	of pelvis	1
	of male breast	1
Alveolar carcinoma	secondary in liver ...	1
Solid or diffuse carcinoma	secondary in liver ...	1
Squamous carcinoma	of cervix uteri	1
	of scrotum	1
Pre-cancerous changes	in a wart	1
Endothelioma	of lymph gland	1
Round-cell sarcoma	of neck	1
	of foot	1
	of sternum	1
	of jaw	1
	site unknown	1
Spindle-cell sarcoma	of arm	1
Adeno-sarcoma	of female breast	1
Adeno-myo-sarcoma (embryonal mixed tumour)	of kidney	1
Melanoma	of foot	2

Detailed comment on the tumours in the above analysis is unnecessary. Rare varieties are represented by fibroma molluscum, adeno-carcinoma of male breast, and adeno-sarcoma of female breast. All the growths occurred in native Africans, with the exception of the wart showing precancerous changes, which was obtained from a European.

RABIES.

Twenty-seven dog's brains and one horse's brain were received during the year for examination for Negri bodies. Negri bodies were found in twelve dog's brains on histological examination. A thirteenth case was found to be positive only after inoculating the glycerinated portion of the brain into guinea-pigs, stained sections having failed to reveal the Negri bodies. The guinea-pigs were inoculated sub-durally with an emulsion of the suspected brain. One died at eighteen days and the other at twenty-four days. Both showed numerous Negri bodies in the multipolar nerve cells of the region of the cornu ammonis. This case is cited in full, as it illustrates the importance of sending a portion of the brain in glycerine for examination. The horse's brain proved negative both on histological examination and on inoculation of animals. All the specimens, except one from Freetown, Sierra Leone, came from stations in Nigeria. The following Table (Table VIII) gives the distribution and the results of examination.

TABLE VIII.

Station.	Number of brains sent.	Number positive.
Abeokuta	1 dog	1
Akwanga	1 ,,	1
Benin	3 dogs	3
Enugu	1 dog	—
Ibadan	3 dogs	1
Kaduna	2 dogs, 1 horse	1 dog
Lagos	12 dogs	4
Port Harcourt	2 ,,	1
Sokoto	1 dog	1

MISCELLANEOUS EXAMINATIONS.

One hundred and one miscellaneous specimens were received during the year, the majority consisting of morbid tissues from various parts of the body for histological examination. A detailed classification would serve no useful purpose. Amongst the more interesting specimens were (1) two cases of Hodgkin's disease, the diagnosis being made from histological examination of cervical lymph glands, (2) a chronic inflammatory tumour from the abdomen which proved to be an infection with a nocardia type of fungus, (3) a helminthic infection, the parasite not being differentiable in sections from onchocerca volvulus, affecting the aorta of a bull, and (4) a fibrous omental tumour containing ova of Schistosoma mansoni.

Several biopsies from skin ulcers were received for examination for Leishmania tropica, but no parasites were found in a large number of sections examined.

Microfilaria.—In January, eighty-nine soldiers of the R.W.A. F.F. stationed in Lagos were examined at night for microfilaria, by kind permission of the O.C. The examination was undertaken for the purpose of finding a suitable case of bancrofti infection for experimental work. Although no case of this type was found it is interesting to record that fifteen *per cent.* of the soldiers showed infection with other microfilariæ, viz. Mf. loa and Mf. perstans.

B. G. T. ELMES.

THE PATHOLOGICAL LABORATORIES.

A pathological laboratory is established at Lagos, Port Harcourt, Calabar and Kaduna in close proximity in each instance to the African Hospital. For the sake of clarity and brevity the reports have been grouped together. Table IX shows the results of the examination of blood smears from Europeans.

TABLE IX.

BLOOD EXAMINATIONS.—EUROPEAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	617	47	67	260
Subtertian parasites	97	11	11	29
Percentage positive...	15·72	23·40	16·41	11·15
Microfilariæ	2	1	2	...

Table X shows the findings from African.

TABLE X.

BLOOD EXAMINATIONS.—AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations...	5,548	1,165	6,735	1,617
Subtertian parasites	1,627	206	953	155
Percentage positive...	29·32	17·68	14·14	9·58
Microfilariæ	73	68	2,018	11
T. gambiense	1	...	...	6
S. recurrentis	1	...	...	4
Quartan parasites	40	...	230	...
Benign Tertian parasites	...	...	3	...

The number of blood smears examined is 16.056 and the findings are interesting. Calabar shows the largest number of quartan parasites, and of microfilariæ, the latter being not unexpected as it is the " home " of " calabar swelling." Kaduna shows the largest number of trypanosomes and of (spironema) Treponema recurrentis, sleeping sickness and relapsing fever being endemic in the Northern Provinces. The Lagos figures include the results in connection with the school medical examination of children, and the Calabar figures include the results from a large number of children examined in a special survey.

Dr. Morrison, Lagos, notes that crescents were present in 0.8 *per cent.* of all smears and in three *per cent.* of all positive smears, Dr. Williams, Port Harcourt, found 0.6 *per cent.* crescents in positive smears from Africans and 3.7 *per cent.* in those from Europeans. Dr. Ramsay, Calabar, writes " The seasonal incidence of microscopically confirmed malaria has been worked out on a series of some 5,000 patients of an average age of about twenty-five years, taken from out-patient department and the wards of the African hospital. It has been shown that there is a sudden and marked seasonal increase in malaria during the months of May and June and that in September the number of patients with parasites in the circulation reaches its minimum. Similar observations have been carried out with microfilaria perstans and microfilaria loa and it has been found that there is no appreciable variation in the numbers of these parasites. A more detailed account of this work will be submitted for publication later."

It should be added that total red and total white cell counts and also differential leucocyte counts were done as and when required. There were 12.196 examinations of fæces. Table XI shows the findings in Europeans.

TABLE XI.

Examination of Faeces, European.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	364	25	45	152
E. histolytica	20	1	...	13
E. coli	2	2	...	2
Ascaris ova	3	2	..	...
Ancylostome ova	4	...	..	...
Trichuris ova	...	...	...	1
Schistosome ova	...	...	...	2

Dr. Morrison notes that free E. histolytica were found in nine cases and the encysted form in eleven; Dr. McCoach's (Kaduna) figures are five and eight respectively.

TABLE XII.

Examination of Faeces, African.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	4,166	1,512	4,559	1,373
E. histolytica	40	46	148	278
E. coli	247	21	...	65
Iod. butschlii	...	...	...	5
Ascaris ova	2,815	467	3,312	93
Ancylostome ova	1,540	524	2,530	300
Trichuris ova	2,380	383	1,444	58
Schistosome ova	9	1	...	11
Strongyloides	181	...	250	1
Tænia saginata ova	16	...	7	...
Enterobius (Oxyuris) vermicularis	...	...	...	3

Dr. Morrison writes that in 1,834 school children examined in Lagos, Ascaris ova were found in seventy-six *per cent.* Ancylostome ova in thirty-one *per cent.* and Trichuris ova in fifty-nine *per cent.* Dr. Williams notes the finding, in one case, of Operculated ova resembling those of Dicrocœlium dendriticum but unfortunately the patient left before further investigation could be made. Dr. Ramsay reports that one case of infection with Balantidium coli was found in a Calabar native. It is the practice in Calabar to administer an anthelmintic to all patients on admission to hospital and this procedure entailed 1,224 re-examinations of fæces, bringing the total up to 5,328. With regard to bacillary dysentery Dr. Young's report, dealing with Lagos, is given separately. Dr. Williams records the cultural examination of the fæces in fourteen cases in three of which a bacillus giving fermentation reactions resembling those of B. dysenteriæ Strong, was found and in one case B. dysenteriæ Flexner. Dr. McCoach writes that a large number of stools from cases of diarrhœal disturbance were plated out. Only a few yielded specific organisms, the majority giving growths of non-lactose-fermenting coliform types. At one period of the year B. fæcalis alkaligenes was a constant find. Four cases of Flexner occurred, one in a European.

Sputum examinations from Europeans were not numerous. There were thirteen specimens in Lagos fourteen in Port Harcourt and eleven in Kaduna. Tubercle bacilli were found in two cases in Lagos and in two in Port Harcourt. Examinations from Africans were more numerous.

TABLE XIII.

EXAMINATION OF SPUTUM, AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	324	310	70	140
Tubercle bacilli	70	24	16	14

Dr. Morrison notes that tubercle shows a slightly greater predisposition to occur in the African as compared with 1929. Urine examinations were mainly concerned with African specimens and Table XIV shows the main findings. It should be noted that at Calabar the usual urine examination is done in the wards and only special examinations are done at the laboratory.

TABLE XIV.

URINE EXAMINATIONS, AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	4,432	351	45	1,855.
Albumen	1,374	109	...	90
Casts	177	34	...	8
Bile	26	2	...	4
Sugar	9	5	...	8
Blood	268	18	...	139
Pus	532	77	...	416
Schistosome ova	34	7	...	124

The prevalence of schistosomiasis is ten times greater, according to these figures in Kaduna than in Lagos. Dr. Morrison writes " I desire again to draw attention to the rarity of schistosomiasis in women in Lagos. In the Lagos figures there were thirty-one men and three women." (As regards rectal schistosomiasis in Lagos, there were eight cases with the typical ova in the stool and all were male). And again " Urinary schistosomiasis would not appear to be common in Lagos for only four out of 1,802 children examined showed the ova." Dr. McCoach investigated five cases, in Europeans, of bacilluria with or without symptoms or pyuria. Two of the cases were non-lactose-fermenting coliform infections and in one of these a staphylococcus was associated. A third case was due to B. fæcalis alkaligenes and a fourth was due to Ps. pyocyanea. The remaining case was of interest in that it yielded a Gram-negative coccus which formed acid only in glucose, and grew well on McConkey's agar. Such an organism seen in the cells of a film of the urinary deposit might readily be taken for the gonococcus by an inexperienced observer.

Kahn and Sachs-Georgi Tests.—The Kahn alone was used in Lagos, both Kahn and Sachs-Georgi in Kaduna, and the Sachs-Georgi alone both at Port Harcourt and Calabar. Table XV gives the results obtained from Africans and Table XVI those from Europeans.

TABLE XV.

KAHN AND SACHS-GEORGI REACTIONS—AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Number of tests	278	52	3,695	245
Positive	131	30	1,409	188

TABLE XVI.

KAHN AND SACHS-GEORGI REACTIONS—EUROPEAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Number of tests	115	20	12	31
Positive	35	9	0	7

The test was a routine one in Calabar only; at the other laboratories it was done only by request. Dr. Morrison believes that the Kahn precipitation test is a very suitable one for the tropics if the titration of the antigen is carried out frequently and with meticulous care. Dr. Ramsay's results at Calabar are to be incorporated in a paper shortly. Dr. McCoach in an endeavour to carry out the full Wassermann technique found that a commercial preparation of dried complement proved, on dilution, to be of too low a titre to be reliable. He found, in his work, a mutual agreement of over ninety *per cent.* between the Kahn and the Sachs-Georgi reactions. There were eighty-two agreed negatives, and of the positives there were twenty-two disagreements (Kahn +, Sachs-Georgi – in 4, and Kahn – Sachs-George + in eighteen).

Widal reactions were not numerous. At Lagos seven and at Kaduna thirty-one were done from Africans, one positive with typhosus and one with para A in Lagos, and two positive with typhosus in Kaduna. Amongst Europeans, the total and the positives were the same as in Africans in Lagos, and in Kaduna there were nineteen tests with two positives with typhosus.

Miscellaneous Examinations.—These are too numerous and varied for useful classification. They totalled 232 in Lagos, eighty-seven in Port Harcourt, 452 in Calabar and 664 in Kaduna.

Examination of Tissues.—Some of the findings are seen in Table XVII.

TABLE XVII.

EXAMINATION OF TISSUES—AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Number of specimens	242	45	78	76
Sarcoma	6	3	...	1
Carcinoma	3	...	3	6
Fibro sarcoma	...	...	...	1
Epithelioma	...	...	2	4
Melanoma	2	1	...	1
Adenoma	...	...	...	1
Erosion	...	...	...	1
Fibroid	...	...	...	1
Condyloma	...	...	...	1
Chancre	...	2	...	...
Endothelioma	...	...	2	...

Post-mortem examinations.—Both at Kaduna and at Calabar the religious or tribal prejudices are against post-mortem examinations and, practically speaking, the only post-mortem performed were those done by Coroner's order. Table XVIII gives the causes of death.

Dr. Morrison notes that accidental injuries show an increase which is solely due to motor vehicles. Even so (accidental injuries nineteen) the number is not large in comparison with the population of Lagos, which numbers about 100,000. Dr. McCoach mentions particularly a case of meningitis from which a Salmonella was isolated. This organism is still being investigated.

TABLE XVIII.

POST-MORTEM EXAMINATIONS—AFRICAN.

	Lagos.	Port Harcourt.	Calabar.	Kaduna.
Total Examinations	207	42	48	15
Injuries	21	2	9	3
Burns...	3	...	...	...
Poisoning	4	...	...	...
Drowning	18	2	4	2
Respiratory disease (excluding T.B.)	35	10	7	1
Circulatory System diseases ...	28	5	6	1
Abdominal diseases (excluding dysentery)	20	3	1	2
Tuberculosis (various forms) ...	17	2	...	...
Nephritis	6	3	5	2
Central Nervous System diseases ...	6	1	...	1
Malignant disease	6	2	...	1
Marasmus, Starvation, Senility ...	6	4	...	...
Genito-urinary diseases (excluding nephritis)	4	...	...	1
Dysentery and Diarrhœa	3	2	7	...
Plague	3	...	...	...
Sepsis	2	...	...	1
Various	11	4	6	...
Unknown (including "found in the sea")	14	...	...	...
Strangulation	...	2	3	...

Water Analysis.—A bacteriological analysis of samples of water, soda-water, etc., was done when required. The results are, in the main, of local interest only.

Vaccine.—These were prepared when requested.

NEURO-VACCINE.

Experimental work was carried out on neuro-vaccine during the year in order to investigate its suitability for large-scale anti-variola vaccination in Nigeria. Its simplicity in manufacture, its freedom from extraneous organisms and its comparatively low costs were attractive features, provided its potency and stability could be assured. We are indebted to Dr. Levaditi of the Pasteur Institute, Paris for the original strain of vaccine in the rabbit's brain. This was sent out on ice, and arrived at the beginning of January. A brief account of the work carried out on animals and of the experimental vaccination of human beings is given below.

Animal experiments. Rabbits.—The strain was kept going either by the subdural inoculation of 0.2 cc of a weak emulsion in sterile distilled water of a virulent brain, or by a similar inoculation of lymph diluted in saline from vesicles from human vaccinations. Most frequently the latter method was necessary as it was found that the virus quickly lost its dermatrophic affinity by brain to brain passage. One or two human skin passages were used to restore this affinity. The virus caused the death of the rabbit in four to five days but it was made a general rule to kill the animal by chloroform when *in extremis* to obviate death during the night and consequent spoiling of the brain by putrefactive processes.

Guinea-pigs.—Three guinea-pigs were inoculated with the original rabbit brain. Two died at three days and one at six days, all showing typical signs of paralysis. The vaccine prepared from the brain showed very slight dermatrophic affinity when used for the vaccination of human beings. Six further guinea-pigs were inoculated, three with rabbit's brain removed by one passage from the original and three with lymph from one human skin passage. None of these animals showed any reaction to the virus.

Preparation of the vaccine. Glycerinated neuro-vaccine.—The brain was removed with aseptic precautions and stored in fifty *per cent.* sterile glycerine in the refrigerator. As required, a portion was emulsified in fifty *per cent.* glycerine, the usual dilution employed for experimental vaccination of human beings being one-fifth, though dilutions of one-seventh and one-tenth were also used. These dilutions were only approximate, as the requisite apparatus for proper emulsification was not available. Two glass rods were sterilised in a large thick test-tube; this gave a simple but effective means by which small portions of brain could be emulsified with the minimum risk of contamination. The vaccine was then drawn up into sterile capillary pipettes which were sealed and stored in the refrigerator. For experimental work on the effect on vaccine of storage at room temperature, the capillary pipettes were wrapped in opaque blue paper and kept in a glass-fronted cupboard away from direct sunlight. The results of these experiments are given below, in the section on human vaccinations.

Lanolated neuro-vaccine.—A thick emulsion, one in two, in sterile distilled water of a rabbit's brain of proved potency was intimately mixed with anhydrous lanoline to a strength of approximately one-third. Tested on the human skin it failed to give any reaction, but it was thought probable that chemical changes in the lanoline, which had been in the country for some time, had adversely affected the virus. No further work on lanolated vaccine was carried out, as the glycerinated preparation, neuro or lymph as the case might be, was that viewed most favourably by those in authority for large-scale production in this country.

Extraneous organisms.—With strict aseptic precautions in preparation, neuro-vaccine is remarkably free from contaminating organisms. Pseudomonas pyocyanea, apparently ubiquitous under local conditions, is the chief source of danger, particularly when inoculating rabbits.

Experimental Vaccination of Human Beings.—The work was carried out, in the first instance, on infants at the Health Office, by the kind permission of Dr. Cauchi, Senior Health Officer.

The greatest difficulty, however, was experienced in persuading the mothers to bring their children back for examination at the end of a week, and much loss of valuable time resulted in efforts to record the effect of the vaccine. It was then decided to commence work among previously un-vaccinated school children. By the courtesy of Dr. Cauchi, the Education Authorities and the School Managements, this was undertaken first at St. Paul's Roman Catholic School at Ebute Metta, and later at St. Jude's Church of England School at Ebute Metta.

It is a great pleasure to record the valuable help of the headmasters and staffs of these schools and to comment upon the high standard of discipline maintained among the scholars.

Method of Vaccination.—Before vaccination, each child was examined for (*a*) evidence of previous vaccination, and (*b*) evidence of previous smallpox, and carefully questioned as to these. Two insertions were made on the left arm in the deltoid region, the usual technique of vaccination being employed. The children were usually examined at the end of a week, but where the development of the reaction was being observed, earlier examinations were carried out.

The Lesion.—The development of the vaccine on the skin conformed in time and character to that of calf lymph, though the reaction on the whole was of a milder type. A certain number of vaccinations with lanolated calf lymph imported from England was undertaken for comparison. Only one brain gave rise to a severe reaction; there was considerable local necrosis of the vaccinated area, and adenitis of the axillary and supra-clavicular glands. There was nothing to account for the enhanced virulence in this rabbit, and on passing through another brain, the virus regained its mild character.

Results of Primary Vaccination of School Children with Neuro-vaccine.

A.—DILUTION ONE-FIFTH.

No. of cases.	No. positive.	Case success rate.	Insertion success rate.
91	56	61%	75%

B.—DILUTION ONE-TENTH.

No. of cases.	No. positive.	Case success rate.	Insertion success rate.
31	18	58%	75%

Effect on Potency of Keeping Vaccine at Room Temperature :—

No. of days at room temperature.	No. of cases vaccinated.	No. positive.
7	10	6
10	7	5
16	5	2
21	10	1
30	10	0

Post-vaccinal complications.—As far as is known, no case of post-vaccinal encephalitis followed the use of neuro-vaccine.

Conclusions, with Suggestions for Further Work.—An average case success-rate of sixty *per cent.* was obtained with the neuro-vaccine, but what actually occurred was a gradual loss of potency in spite of attempts at rejuvenation by skin passage. The earlier experimental work gave as high as ninety-one *per cent.* positive cases. The neuro-vaccine is obviously of too low a potency for general use in its present state. Attempts at rejuvenation by human skin passage have not been entirely successful, but it may well be worth while to test the effect of testicular passage in rabbits. The moderate skin reaction in human beings is not what one was led to expect from perusal of the current literature. Deterioration of the vaccine is fairly rapid at room temperature, but storage in the refrigerator up to seventy-five days resulted in no loss of potency. Refrigerator storage for much longer periods would probably do no harm to the virus. The warm, humid climate of Lagos cannot be considered the most suitable for the production of a potent anti-variola vaccine but the situation of this Institute has obvious advantages from the point of view of distribution of vaccine throughout Nigeria and to neighbouring colonies. In the event of failure of experiments in testicular passage in rabbits, an attempt will be made to cultivate calf lymph vaccine, using the local breed of small cattle, provided calves are available in sufficient numbers. Sheep also suggest themselves as possible vaccinifers.

E. C. SMITH & B. G. T. ELMES.

APPENDIX B.

REPORT OF TSETSE INVESTIGATION, 1930.

BY

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ANNUAL REPORT—TSETSE INVESTIGATION, 1930.

During the earlier part of the year the absence of electrical power and of a sufficient supply of suitable experimental animals greatly handicapped the laboratory work. As soon as these deficiencies could be remedied, working conditions were greatly improved, although the lack of an adequate water supply still caused inconvenience, as the water purification system has not yet been completed.

Although much of the scientific work done is not yet sufficiently complete to allow of publication, the following papers have been published during the year : " Glossina palpalis and Sleeping Sickness at Ganawuri, Plateau Province, Northern Nigeria " by A. W. Taylor. " A Comparative Study of Human Trypanosomiasis in Kano and in the Plateau Province (Northern Provinces of Nigeria) " by C. W. Hope Gill. " Note on the effect on the Infection Rate in the Tsetse of Mixing Two Strains of Trypanosomes in its Infecting Feeds " by A. W. Taylor and H. M. O. Lester. " The Domestic Mosquitoes of Gadau, Northern Nigeria, and their relation to Malaria and Filariasis " by A. W. Taylor.

A final report on the experimental clearings and their effect on the two species of tsetse in course of preparation.

LABORATORY WORK.

Cattle Experiments.

At a meeting of the recently formed Committee of Animal Husbandry, a tentative plan of work was adopted in which the Veterinary Department, the Tsetse Investigation and the Dietetics Pathologist were to co-operate in the investigation of " Modu " a disease of cattle which has been noticed in some parts of Zaria and elsewhere. The Veterinary authorities recorded that this disease was characterised by association of Pica, the eating of earth, etc., with trypanosomiasis. It was decided that the part of the work to be undertaken by the Tsetse Investigation should be concerned with an attempt to induce " Modu " artificially at Gadau.

Experiments were planned to show whether trypanosomiasis played a part in the development of " Modu " and if so whether this could be obviated by giving extra salt in the diet. These have been carried out under the supervision of the Assistant Veterinary Pathologist.

The animals used for this experiment were ordinary Fulani cattle consisting of two heifers, a cow, and the remainder bulls of varying ages. These were obtained from different herds in April and were brought into very good condition by supplementing the local bush grazing. At the end of July these healthy animals were divided into two groups, group No. 1-10 being put on the ordinary diet without added salt and group No. 11-20 on the same diet but with rock salt *ad lib*. A month later five animals from each group were given a subcutaneous dose of blood from a goat infected with *T. vivax*, each dose containing 1,000,000 trypanosomes. Thereafter temperatures were taken twice weekly, the blood being examined by fresh and thick stained films. Weekly estimates of the blood calcium and blood chlorides were made by Dr. Kane, the Acting Biochemist. Within a few days trypanosomes could be demonstrated in the blood of all the inoculated animals, the appearance of these being coincident with a rise of temperature (103.2-105). No difference in the course of the infection indicated by the incubation period and clinical picture, could be detected in either group. There were no significant variations in the blood calcium and chlorides in these beasts even up to the point of death.

At the beginning of the experiment it was intended that the uninfected cattle should be kept as controls. Unfortunately these developed trypanosomiasis later on and this was probably acquired through being bitten by wild fly while grazing in the bush. This accidental infection of the controls hardly affected the validity of the experiment as it can be shown that all the cattle purchased seemed quite healthy and certainly exhibited no signs of "Modu" though they were not being given any increase in their diet.

During the latter half of November animals Nos. 2, 6, 7, 8, 9 and10, all in the no salt group, were seen to be eating ant-hill. None of the animals in group 2 were seen to do so. This occurred three and a half months after salt was withdrawn and two and a half months after infection. At the end of the experiment only four animals remained alive in each group. The surviving "Modu" animals were given doses of tartar emetic which as far as could be observed stopped this craving for ant-hill. The numbers available for this latter experiment were too small for it to be of much value.

The conclusions to be drawn from these experiments are :—

(1) That the giving of an increased salt ration has no effect on the virulence of trypanosomiasis in cattle.

(2) That animals infected with trypanosomiasis may exhibit "Modu" and that this does not occur if they are given salt *ad lib.*

It is possible that animals suffering from trypanosomiasis, owing to changes in their general metabolism, require increased quantities of salts; when these are not available in their ordinary diet, they attempt to make up the deficiency by eating ant-hill. If this is correct "Modu" is a symptom in trypanosomiasis and so should disappear when the animals are treated and cured of the disease.

AN INVESTIGATION INTO SOME LOCAL SLEEPING SICKNESS.

It is generally believed that Sleeping Sickness in West Africa is due invariably to *T. gambiense* and that *T. rhodesiense* does not occur. Recently Yorke, Adams and Murgatroyd (1930) have investigated a human strain "Sherifuri K" isolated from this district. They found that this strain differs markedly from the ordinary *T. gambiense* in that it was partially susceptible to human serum in vitro, sub-inoculated animals showed numerous posterior nuclear forms and its pathogenicity to guinea-pigs appeared to resemble a *T. rhodesiense* strain which after a year's passage through guinea-pigs had become slightly serum sensitive.

In this locality both *G. tachinoides* and *G. morsitans* are present, though the former fly is the usual carrier of sleeping sickness. The Sleeping Sickness Officers report that occasional cases are found which are very resistant to treatment with tryparsamide, one such case recently occurred in a European member of our staff.

In order to throw some light on the possible occurrence of *T. rhodesiense*, a number of human sleeping sickness strains were isolated from patients in the district and are being kept under observation in laboratory animals. A careful investigation is being carried out into the characteristics of these strains and it is hoped that, if this can be continued over a considerable period of time, information may be obtained which may be of some help in illuminating the problems of the epidemiology of sleeping sickness.

Although this work is still very incomplete, a brief account follows of observations made on these strains up to the time of writing.

ORIGIN OF THE STRAINS.

Strains 1-4 were isolated in May 1930 by the inoculation of 4 cc. of blood from sleeping sickness patients attending Gadau dispensary into clean monkeys, strain OG having been obtained in a similar manner in July 1929. In each case the patient was afterwards given a course of twenty-one grms. of tryparsamide and was reported as having responded well to this treatment being discharged as apparently cured. These strains have been maintained in guinea-pigs.

As no human strains of *T. rhodesiense* were available for comparison, two laboratory strains of *T. brucei* isolated from wild *G. morsitans* have been used for this purpose.

VIRULENCE IN LABORATORY ANIMALS.

The points which are being considered are (1) the incubation period; (2) the duration of the disease; (3) the character of the disease as indicated by the numbers of trypanosomes in the peripheral blood.

Strains 3 and 4 are fairly virulent whereas strain 1 is very avirulent. In the findings there has been nothing incompatible with these strains being ordinary *T. gambiense.*

THE OCCURRENCE OF POSTERIOR NUCLEAR FORMS.

The presence of short forms with the nucleus displaced posteriorly in recently isolated strains of human trypanosomiasis has long been regarded as one of the chief means of distinguishing *T. rhodesiense* from *T. gambiense.* Lavier (1927) showed that by careful search occasional posterior nuclear forms could also be found in *T. gambiense* though these are infinitely rarer than in *T. rhodesiense.*

All five of our strains have been examined for posterior nuclear forms at frequent intervals, the standard adopted being that the nucleus should be sufficiently displaced to lie in the posterior third of the trypanosome. The results of these examinations are given as the number of posterior nuclear forms *per cent.* of total short forms. Strain 1 had 0.1%, Strain 2 1.0%, Strain 3 4.1%, Strain 4 0.3% and Strain OG 2.0%. These figures show that posterior nuclear forms are comparatively common with Strain 3, in two guinea pigs figures of thirteen *per cent.* and fifteen *per cent.* were obtained and these are high enough to be comparable with those given by the classical *T. rhodesiense* strains.

THE REACTION TO DRUGS.

Up to the time of writing, tryparsamide has been the only drug tested, infected guinea pigs being given a dose of 0.04 grm. per kilo body weight and blood examinations done at frequent intervals. Human strains 2, 3, 4 and OG were very sensitive to this drug, the peripheral blood being freed from trypanosomes in under six hours. Strain 1 was found to possess a very considerable degree of resistance to tryparsamide; with several guinea pigs therapeutic doses failed to clear the peripheral blood even after forty-eight hours. The two brucei strains were found to be completely resistant to tryparsamide. An attempt is being made to render Strain 4 arsenic fast by giving repeated small doses of tryparsamide. If this is successful, transmission experiments will be carried out.

THE REACTION TO HUMAN SERUM.

In Vitro at 37°C.

In these experiments the technique elaborated by Yorke, Adams and Murgatroyd was used. All the human strains were found to be insensitive to human serum, while with the brucei strains all trypanosomes were killed off in about six hours.

In Vivo.

Doses of human serum were injected intraperitoneally into series of infected mice and guinea-pigs giving results similar to those of the in vitro experiments.

It was found that the sensitiveness of *T. brucei* to human serum could be readily diminished.

Repeated injections of human serum were given to infected mice until the trypanosomes became serum fast. Transmission experiments are being done to show whether this acquired character can be passed on by cyclical transmission through the tsetse fly. Results are not yet available.

THE REACTION TO THE ADHESION PHENOMENON.

The technique used was substantially the same as that described in previous reports. When the freshly isolated strains were first tested against the plasma from treated sleeping sickness patients, strong positive results were obtained, while negative results were given by the plasma for brucei animals. Recently there appears to have been some falling off in the strength of the reaction against sleeping sickness plasma though the plasma of brucei animals still gives negative findings.

TRANSMISSIBILITY.

So far only two of the sleeping sickness strains have been investigated, these Strains 1 and 4 have been found to be readily transmissible by *G. tachinoides*.

This investigation as far as it has been carried at present has shown that two at least of these local strains picked entirely at random, differ very markedly from the classical *T. gambiense*. Strain 1 although it is comparatively avirulent and shows few posterior nuclear forms possesses a natural resistance to arsenic, while Strain 3 shows a quite abnormally high percentage of posterior nuclear forms.

SEROLOGICAL INVESTIGATION.

In the earlier months of the year when working conditions were still difficult, numerous small experiments of a tentative nature were carried out. These together with the serological work, and feeding experiments described later were done by the Immunologist and the Assistant Veterinary Pathologist.

PRELIMINARY EXPERIMENTS.

Among the points studied was the question of the relationship between the number of trypanosomes in an infecting dose, the incubation period, and virulence of the infection. From this it was possible to get an idea of number of trypanosomes which would be likely to produce a satisfactory experimental infection. Observations were also made on the results obtained by the administration of Bayer 205 to infected animals and on the effect of endothelial blockade and splenectomy in the defence mechanism of the animal in experimental trypanosomiasis.

COMPLEMENT FIXATION IN TRYPANOSOMIASIS.

(1) The Wassermann Reaction or Non Specific Fixation.

There is some difference of opinion as to whether the sera from sleeping sickness cases have the property of fixing complement in the presence of Wassermann Antigen. As most of the observations on this test in trypanosomiasis have been made in temperate regions using experimentally infected animals, it was decided to reopen the question using the numerous cases of human and animal trypanosomiasis which are available here.

The Kahn Test has been used as a check on the Wassermann Reaction.

Amongst the reagents required for the performance of complement fixation tests are haemolysin, fresh complement and antigen.

HAEMOLYSIN.

It was found that the imported hutch rabbit could not be made to give serum of a sufficiently high titre. A supply of this serum had to be obtained from Messrs. Burroughs Welcome & Co., and is giving every satisfaction.

COMPLEMENT.

At the start it was found that the complementary properties of our guinea-pig sera were exceedingly low. Fortunately after some weeks of work there was a tendency for the titre of the complement to increase, and it is possible that the arrival of the cooler Harmattan season has generally improved the health of the animals and led to the production of this increased titre.

ANTIGEN.

The first few tests were performed with a ready made commercial antigen. Since then three different Wassermann antigens have been prepared; two of these were of the ordinary alcoholic extraction type and the other was made according to Kolmer's new technique.

Up to the time of writing only a few complete Wassermann reactions have been performed. In doing these a most unexpected difficulty turned up, namely the property of many of the human sera of fixing complement in the absence of antigen. This is believed to be a rare complication in temperate regions and when it does occur the process of heating during inactivation is generally sufficient to remove this anti complementary property whereas in the cases tested here heating makes it more active. The significance of this is not understood. From the general serological point of view the matter is very important, since this peculiar property of serum, unless it can be removed, renders the performance of the Wassermann reaction impossible in these cases.

No correlation appeared to exist between the amount of natural complement and this anti complementary property.

(2) Specific Complement Fixation.

Along with the Wassermann reaction it is intended to run a series of specific fixation tests, using an antigen prepared from trypanosomes obtained from the blood of infected white rats, after the method employed by Watson. A small quantity of this antigen has been prepared from *T. brucei,* and as was expected it fixed complement in the presence of brucei infected serum and also in the presence of serum from sleeping sickness patients.

FEEDING EXPERIMENTS.

A preliminary feeding experiment was done to see if the growth rate in young white rats living on an average native (dry season) diet showed any appreciable difference when compared with controls living on an adequate physiological diet. Twenty-four young rats were divided into two groups, one of which was fed on the physiological diet (B.D.H. diet with added vitamins) the other being given the native diet to be tested. The latter consisted of a mixture of guinea-corn flour, bean flour, ground nuts, locust bean, dried fish, millet flour, dried powdered Baobab leaves and black salt. This experiment was continued for six weeks. At the end of that time the rats fed on native diet showed no evidence of deficiency disease and while the growth rate was not good, it was fairly satisfactory.

Two other experiments are under way to test the effect of the absence of (1) Vitamin A & D and (2) Vitamin B on the susceptibility and resistance of rats to *T. gambiense* infection. These however are not yet sufficiently advanced for any conclusion to be drawn from them.

CULTIVATION OF TRYPANOSOMES.

The Technique used was that described by V. Razgha (1929). This is essentially a blood medium and consists of equal parts of sterile Ringer solution (0.6 *per cent.* NaCl) and citrated human blood in $\frac{1}{4}$ volume two *per cent.* Sodium citrate in 0.85 *per cent.* NaCl. The mixture is allowed to stand four days at room temperature before inoculation. The scope of this work is being extended to include the culture of trypanosomes pathogenic to animals as well as man in media made from animal as well as human bloods. The results so far obtained indicate that *T. gambiense* can be grown in both human and monkey blood, *T. brucei* in monkey blood but not human blood and *T. vivax* in neither human nor monkey blood.

BIOLOGICAL CONTROL OF TSETSE.

Preliminary work on the above subject has been done. During the tsetse breeding season of 1929-30, large collections of *G. tachinoides* and *G. morsitans puparia* were made in the Sherifuri district. A very small percentage of pupae were found to be parasitised by a Bombylied, *Thyridanthrax argentifrons* and still smaller percentage, (*G. tachinoides* only) by *Stomatoceras micans*. The estimation of the parasitism rate is being continued during the 1930-31 breeding season and a parallel investigation is to be made on the River Benue, where it is possible that other parasites and a higher parasitism rate may occur. On the conclusion of this preliminary work it will be possible to estimate the chances of success in utilising this method as a means of tsetse control in Northern Nigeria.

TRANSMISSIBILITY OF T. GAMBIENSE STRAINS.

Laboratory experiments on the transmissibility of *T. gambiense* strains by *G. tachinoides* are being conducted. It is hoped that sufficient strains may be investigated to make it possible to state definitely whether non-transmissible strains occur frequently and whether considerable differences in transmissibility exist between *T. gambiense* strains from contrasting sleeping sickness areas in Northern Nigeria.

THE SEDIMENTATION RATE OF RED CELLS IN THE BLOOD OF SLEEPING SICKNESS PATIENTS.

In this investigation the Fahraëus technique was used, the " half value " for sedimentation of an approximate thirty cm column of blood being taken as the critical reading. The conclusions reached were that although there was a very great increase in the rate of sedimentation in sleeping sickness, the test is unlikely to be of much diagnostic value as other common wasting diseases such as dysentery, schistosomiasis, severe malaria, etc., have equally high rates. It was found that the rate corresponded roughly with the clinical condition of the patient, mild cases giving low rates and severe cases high rates.

THE CALCIUM CONTENT OF THE BLOOD IN SLEEPING SICKNESS.

Estimates have been made of the amounts of calcium in the blood of a series of sleeping sickness patients and of a control series of Africans either healthy or suffering from some disease unlikely to disturb the calcium metabolism. The earlier figures showed a very definite deficiency in the majority of the sleeping sickness patients while in the control cases there was little variation from the accepted normal standards. Later in the year there was a very marked change in the results. While the controls increased slightly, the figures for sleeping sickness patients were very much higher than before, the bulk of them being almost normal. No cause has yet been found for this change but the matter is still under investigation.

FIELD WORK.

The experimental clearings described in previous reports are being maintained in their present condition by annual reslashing of regrowth. No extension of the area is being undertaken though various experiments in clearing methods are being continued.

Estimates of the densities of *G. morsitans* and *G. tachinoides* in the experimental area are being made annually. The records obtained in April and October, 1930, show no appreciable change from those of the preceding two years, and the fly density thus appears to be stationary.

The clearing experiments have been under the general supervision of the Forestry Officer who reports as follows.

SHERIFURI CLEARINGS.

The reslashing operations occupied three months and embraced twenty-eight miles or 3,402 acres of the original 1927-28 clearing at an average cost of 2s. 10d. per acre. Costs were at a minimum in and around the wandering stream (" Malele ") which flows from and back to River Katagum and at a maximum on the south bank of the River Kiawa where the banks formerly heavily timbered had large swamps (fadama) with luxuriant vegetation around them stretching inland for ¼ to ½ mile. As far as possible ordinary coppice regrowth and growth from epicormic buds has been checked by " stripping " stumps.

MATYORO CLEARINGS.

Reslashing was started late in the dry season. Both banks of the lake system, 6½ miles each side a total of 1,145 acres were reslashed at an average cost of 6s. 6½d. per acre. Regrowth was least in the West which is fly-free and greatest in the East where fly chiefly *G. morsitans* are still dense in the wet season. The dam mentioned in the 1929 report was reconstructed of puddled loam with exterior and interior ironstone retaining walls. It remained intact during the rains and had the effect of raising the general wet level some three feet. This flooding had little apparent effect on the palustrine Fig or the Raphia palms, but caused an increase of the Sedge (*Cyperus sp.*) association. Below the dam on the other hand the lack of moisture produced a distinct diminution of vigour and regrowth of these species and a marked invasion of grasses, bracken and herbs. To the West in very thorough clearing, there is a similar invading plant succession.

Over three miles of good farm land 200-300 yards wide on each of the lakes is now available for settlement, of this only a small part has been taken up. The damaging of crops by baboons is a great deterrent at present. This pest will be lessened if there are more farmers and more concentrated farms, which will be needed in any case if the experimental area is to be of full value.

EXPERIMENTS.

The experimental treatment of heavy woodland savannah with thicket, dscribed in previous reports, is giving fair results. The present health of preserved trees is poor where heavy slash has encouraged fire and these will undoubtedly succumb. On the other hand grass invasion chiefly of *Andropogon guyanus* and *Andropogon sp.* is now established as a ground flora in association with many of the larger trees, the whole constituting a light woodland savannah.

The other experiment of removing creepers and thicket and sapping supporting trees has given excellent results and it is probable that this method will be adopted as the cheapest and most efficient means of dealing with fringing thicket of no great width at primary or important secondary foci.

Further experiments with methods of dealing with thicket have since been carried out on the principle that steady slow combustion, confined where possible, is of much greater value in preventing regrowth than the fiercest transient blaze. In addition to grass and wood fuel being stacked on thicket, it was also packed very thoroughly in on the ground. The crown fire is fierce and rapid and with the collapse of the crown falls and joins the ground fire. Burning then continues steadily for a considerable time up to two days. This experiment on recent inspection, showed no thicket regrowth, but charred roots and vigorous herbaceous invasion of an area enriched by ash. This method may be known as " Stacking and Packing ". On the same principle a large Tsamia (*Tamarindum indica*) was " Char-pitted " with complete success. Briefly the method is exposure of the lateral roots and construction of a simple charcoal pit on these and round the bole. The fire burns under control for about two days and one man can keep seventy-five pits going. The operation is more lengthy than felling the tree but any possibility of regrowth and that only from root suckers, is rendered remote. This method would be employed only for large trees such as Zuwo and Giyeya where it is worth while dealing with them in such a manner as to obviate further trouble.

Experiments have been made in poisoning trees with a solution of arsenious oxide and caustic soda. Results are not yet apparent.

SLEEPING SICKNESS WORK.

Dr. J. C. Paisley, Senior Sleeping Sickness Officer reports:—

During the year 5,234 cases of sleeping sickness have been treated, 2,891 by the travelling Sleeping Sickness Medical Officers and 2,343 at hospitals and dispensaries, including the dispensary at the Tsetse Investigation Headquarters.

The cases were distributed as follows:—

(*a*) Cases treated by Sleeping Sickness Medical Officers:—

Plateau Province—Ganawuri district 1,089—Mama and Mada districts 1,348—Jaba district (Jemaa division) 245—Kagoro district ninety-six.

Bauchi Province—Gadau area 420.

Kano Province—Rano—Tudun Wada (Kano Emirate) eighty-nine—Hadeija seventy-seven—Jafun four.

(*b*) Cases treated by other Medical Officers:—

Azare 322, Kafanchan 321, Bauchi 290, Buea 207, Lafia 188, Kano 115, Victoria forty-five, Makurdi South twelve, Kaduna seven and Mamfe one; others 349.

Sleeping sickness treatment centres have been maintained throughout the year at Gadau, and in the Mama-Mada area, for the first ten months of the year at Ganawuri, and for the last seven months in the Rano-Tudun Wada area of Kano Emirate. The efforts of the sleeping sickness officers have been directed particularly to completing the treatment of as many cases as possible rather than to the accumulation of large numbers of cases only partly treated.

An experiment in intensive sleeping sickness surveys of infected areas was undertaken in the Jaba district of the Jemaa division, Plateau Province, with satisfactory results. The population of the district was found by the survey team to be 14,842. Of these ninety-eight *per cent.* were inspected and 2.6 *per cent.* found to be infected and given a full course of treatment. The counting, inspection, and examination of the area was completed in three weeks, and all cases noted and given identity discs. Treatment was not commenced until the inspection was finished. It is intended to follow this plan in future surveys of the same nature.

With the assistance of the Administrative Officers concerned, both Southern and Jemaa divisions will be completely surveyed in the first half of next year.

Training of native dispensary attendants is proceeding at Gadau, attention being particularly directed to teaching the use of the microscope in the diagnosis of sleeping sickness. Some of the boys show great aptitude for the work, and become quite reliable within a remarkably short time. In the survey of the Jaba area referred to above, all the microscope work was done by a team of these boys, the findings being in each case confirmed by the sleeping sickness officer in charge. A time limit of ten minutes was set to each examination, if no trypanosomes had been found then, the slide was pronounced negative. Treatment was also carried out by the attendants under the direction of the sleeping sickness officer.

Treatment of cases in Gadau is now controlled by lumbar puncture. This is a routine procedure at the beginning of treatment, and where possible at the end of the prescribed course. In cases in which the cerebro-spinal fluid is normal or only slightly altered, Bayer 205 is given; in those with a cell count of over twenty to the cubic millimetre, tryparsamide is the main drug employed. No apparatus is available to estimate accurately the amount of albumin, but the phenol-globulin test is used as a rough indication.

A series of cases with cell counts varying from twenty to over 1,000 per cubic millimetre has been treated with trypanarsyl, and the results compared with those of a similar series treated with tryparsamide. A few representative figures are given below.

TRYPARSAMIDE.

Number.	Sex.	Age.	On admission.	Quantity of drug.	After treatment.
1769	M.	25	Cells 155 globulin +	21 grms.	Cells 14 globulin +
1768	M.	15	,, 178 ,, +	21 ,,	,, 20 ,, +
1840	M.	50	,, 296 ,, ±	21 ,,	,, 21 ,, ±
1765	M.	24	,, 364 ,, +	21 ,,	,, 25 ,, +
1823	M.	26	,, 555 ,, +	21 ,,	,, 18 ,, ±
1770	M.	15	,, 604 ,, +	21 ,,	,, 12 ,, +

TRYPANARSYL.

Number.	Sex.	Age.	On admission.	Quantity of drug.	Result after treatment.
1779	M.	15	Cells 153 globulin +	11 grms.	Cells 18 globulin +
1764	F.	35	,, 188 ,, +	16 ,,	,, 10 ,, +
1754	F.	10	,, 280 ,, +	10 ,,	,, 8 ,, ±
1763	M.	40	,, 309 ,, +	16 ,,	,, 5 ,, —
1761	M.	37	,, 592 ,, +	16 ,,	,, 58 ,, +

Unfortunately, the number of cases compared is small, for while patients show no objection to the lumbar puncture at the beginning of treatment, they very frequently run away just before they are due for the second, on completion of treatment. It may be tentatively stated however, that trypanarsyl is as efficacious as tryparsamide.

Trypanosomes have been found in the cerebro-spinal fluid of a number of cases who showed neither glandular enlargement or trypanosomes in the blood. The glands in these cases were not merely sclerosed, no trace of glandular enlargement could be discovered, and the history in some of them was very short.

As trypanosomes have been found in the majority of altered cerebro-spinal fluids, lumbar puncture is thus a valuable aid to diagnosis in suspected cases, when simpler methods fail.

APPENDIX C.

REPORT OF THE X-RAY DEPARTMENT, LAGOS, 1930.

BY

H. H. STEWART, M.B., CH.B.
Specialist.

AFRICAN HOSPITAL, LAGOS, X-RAY DEPARTMENT—ANNUAL REPORT.

In August 1930, the new buildings were occupied and the old rooms handed over for demolition.

Although not in the first instance designed for an X-Ray Department, the new buildings have been adapted in a most satisfactory manner.

All the rooms communicate with each other, as well as open on to a verandah.

The principal rooms are as follows :—

(*a*) Office.
(*b*) Main X-Ray Room.
(*c*) Dark Room.
(*d*) Screening Room.
(*e*) Special Treatment Room.
(*f*) General Treatment Room.
(*g*) Motor Control Room.

All rooms are decorated in cream and dark green paint which is cool and restful to the eyes. This colour scheme includes the dark room and screening room, if light is properly excluded there can be no excuse for the black paint which so often renders these rooms dull and depressing.

The new valve set has been placed in commission and has proved most satisfactory. This set is similar to those installed at Port Harcourt and Kaduna and is a great improvement on the old disc rectifier which has been in use since 1924.

The routine examinations included opaque meals mostly in Europeans in whom stomach trouble would seem high when compared with their numbers and the medical examinations held prior to coming to this country.

Motor accidents, as in other years, accounted for a large proportion of the fractures examined.

The total number of cases examined was 640 which as in most instances more than one skiagram is made means that about 1,200 exposures were used in the year's work. The portable X-Ray apparatus was placed in commission in the new Wards.

The following is an analysis of cases :—

"A"

Arthritis	9
Barium Meal	50
Bladder	3
Chest	38
Dislocations	14
Foreign Bodies	18
Gall Bladder	5
Head	28
Jaws	22
Joints	79
Kidney	9
Fractures Upper Limb	110
Fractures Lower Limb	76
Necrosis Bone	9
Osteomyelitis	19
Peritonitis	21
Spine	20
Not classified	110
Total	640

The electro therapeutic side of the work was carried out as before, though serious interference was caused by the building activities of the Public Works Departments, and the necessity for stopping treatment for nearly a month during the change over of buildings, for unlike the X-Ray Section no duplicate apparatus was available.

A large number of cases of skin disease were treated by ultra violet rays with most satisfactory results.

Ringworm proved most amenable to such treatment and the resources of the Department were concentrated on such cases.

The following is a rough classification of the cases treated during the year :—

"B"

Adenitis	10
Arthritis	122
Fibrositis	6
Favus	27
Granuloma	18
Impetigo	7
Local Injuries	21
Lupus	87
Neuritis	8
Obesity	16
Paralysis	13
Ringworm	496
Sciatica	23
Skin Various	91
T. B. Glands	29
Ulcers	66
Warts	4
Various	68
Total	1,112

APPENDIX D.

REPORT OF THE MEDICAL TRAINING COLLEGE, YABA, AND SCHOOL OF PHARMACY, ZARIA, 1930.

BY

GORDON TAYLOR, M.R.C.S., L.R.C.P.
Superintendent.

MEDICAL TRAINING COLLEGE, YABA, AND SCHOOL OF PHARMACY, ZARIA—REPORT FOR 1930.

The year 1930 was characterized by the opening of the Medical Training College at Yaba and the School of Pharmacy at Zaria.

This report is therefore submitted in two parts :—

(*a*) that dealing with the Medical Training College, Yaba,
and (*b*) that dealing with the School of Pharmacy, Zaria.

A.—Medical Training College, Yaba.

Although the Medical Training College was not formally declared open, classes began on October 6th, 1930.

The College is situated on the main Lagos-Abeokuta road, at Yaba, about five and a half miles from Lagos.

The premises consist of two school buildings, a hostel for students, two bungalows for African Staff, and two bungalows for European Staff. Each of the school buildings is of the semi-permanent type. The first comprises a combined chemical and physical laboratory which can accommodate twenty-eight students, a pharmaceutical laboratory, a dark room, and two store-rooms. The second comprises a lecture-room, a combined library and lecture-room, an office, museum, and students's cloak-room. The hostel, which is also of the semi-permanent type, contains a dormitory, a dining-room, and the usual store-rooms and offices. The hostel can accommodate twenty-four students. The buildings are provided with electricity and stand in a compound of about twenty-six and a half acres.

The equipment throughout is of the latest type, electricity being used for heating wherever possible.

The School of Pharmacy was transferred from the pathological block of the new African Hospital to the new College buildings on October 6th.

Until August 18th the staff consisted of the Superintendent of the School of Pharmacy, the Assistant Superintendent of the School of Pharmacy, and two members of the African Staff. The Assistant Superintendent and one of the African Staff were transferred to Zaria on August 18th, another Second-class Dispenser being engaged on that date for service in Lagos. After the tranference of the school to Yaba, another Second-class Dispenser was attached to the staff. A Medical Officer was transferred from Port Harcourt and assumed duty at the Medical Training College on October 7th.

The number of pharmaceutical students registered during the years was fifty-seven, an increase of fifteen over last year. This number includes six " Grade B " medical scholars from King's College, twenty-nine other Government subsisted students, one student subsisted by the Native Administration of Ibadan, one by the Native Administration of Zaria, the remainder being private students. Thirteen medical students entered the College on November 3rd, twelve of them being " Grade A " medical scholars from King's College.

Throughout the year the Superintendent performed the administrative duties of the School of Pharmacy and, after its amalgamation with the Medical Training College, he performed those of the entire College.

Lectures to the pharmaceutical students were delivered by the Superintendent, by the Assistant Superintendent before his transference to Zaria, and by the members of the African Staff.

Lectures to the Medical students were delivered by the Superintendent and by the Medical Officer attached to the College.

The Superintendent and the Assistant Superintendent acted as members of the Sub-Committee appointed by the board of Medical Examiners to conduct each of the following examinations held under the Poisons and Pharmacy Ordinance:

(*a*) Chemist and Druggist's Examination in January,
(*b*) Dispenser's Examination in February and July.

The Superintendent conducted the Examination of Entrance in February and July.

The classes for pharmaceutical students were conducted as last year, except that a daily continuous session of six hours replaced the former double session after the amalgamation of the school of Pharmacy with the Medical Training College, Yaba. A similar arrangement was originally made for the medical students, but unfortunately certain difficulties arose in obtaining transport facilities to Yaba with the result that classes were not held at Yaba but at the African Hospital, Lagos.

The curriculum for pharmaceutical students was the same as last year. Medical students received instruction in accordance with the suggested syllabus set out in the Superintendent's report on the training of Medical Assistants. The subjects of the first Professional Examination were Elementary Biology, Inorganic Chemistry and Physics.

The Chemist and Druggist's Examination was conducted by the Board of Medical Examiners for the first time in January. The two senior Second-class Dispensers of the School Staff were the successful candidates.

The Dispenser's Examination was held in February and July. Nine candidates satisfied the Board in February and five in July.

The Examination of Entrance was held in January and July. Fourteen candidates were successful in January and five in July.

School and College examinations were held for pharmaceutical students as in former years and medical students received a written or oral examination once a week. These examinations proved of great value in assessing the progress made by each student.

While the Examinations under the Poisons and Pharmacy Ordinance were being held the School of Pharmacy was closed for vacation.

On the whole the health of the students was good. The staff paid every attention to matters of hygiene. Several cases of minor ailments were treated at the African Hospital, Lagos, and the Dispensary, Ebute Metta. No case of notifiable disease was reported.

B.—School of Pharmacy, Zaria.

The School was formally declared open on September 20th, 1930, by His Honour, the Acting Lieutenant Governor, Northern Provinces.

The School is situated on the main Zaria-Kaduna road about two miles from Zaria station.

The premises now in use were originally erected as an Infectious Diseases Hospital, but were afterwards converted to their present purpose by the Public Works Department. The School therefore consists of several small concrete buildings, six in number, all of which, together with European, African, and students quarters, stand in a compound of some fourteen acres. The largest of the school buildings contains a lecture-room, a laboratory for chemistry and physics, and a store-room. Attached to this building, there is an underground tank which collects rain-water from the roof. The next largest building is fitted up as a dispensary, with store-room, poison cupboard, and wash-up room. The remaining buildings are utilised one as a museum, one as a distillation room, and the others as store-rooms for bulky articles.

Apart from rain-water, water is obtained from two wells in the compound. Early next year, however, running water will be available from the elevated tank in the new African Hospital.

Since the opening of the School, the staff has consisted of the Assistant Superintendent of the School of Pharmacy, and a Second-class Dispenser of the African Staff.

The students, ten in number, received their preliminary education at the various middle schools in the Northern Provinces, after which they proceeded to the special medical class at Katsina Training College. They are all Hausas of a fairly high social class, cleanly in habit and gentlemanly in manner. Their knowledge of English is very good.

The subjects taught were Inorganic Chemistry, Physics, Botany, Pharmacognosy, Forensic Pharmacy and Pharmacy.

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